Leibniz-Institut für Astrophysik Potsdam

AIP

ISC proudly presents:

3. AIP-Jamboree, December 12, 2014

The rules of the game:

- 2 minutes (2 slides)

- Present yourself and your work

- Get to know the colleagues

Joar Brynnel

Milky Way and the Local Volume

Joar Brynnel - Background

- 1990 – 2003: European Southern Observatory
  - Instruments VLT/NTT:
    - ISAAC, SOFI, UVES, CRIRES
  - VLT HW standardization
  - Adaptive Optics:
    - MACAO, MAD
- 2003 – 2014: Large Binocular Telescope
  - Systems Engineer
  - Engineering Manager
  - Commissioning Manager
    - Telescope, Instruments, Adaptive Optics
- 2014 - present: AIP
  - 4MOST Project Manager

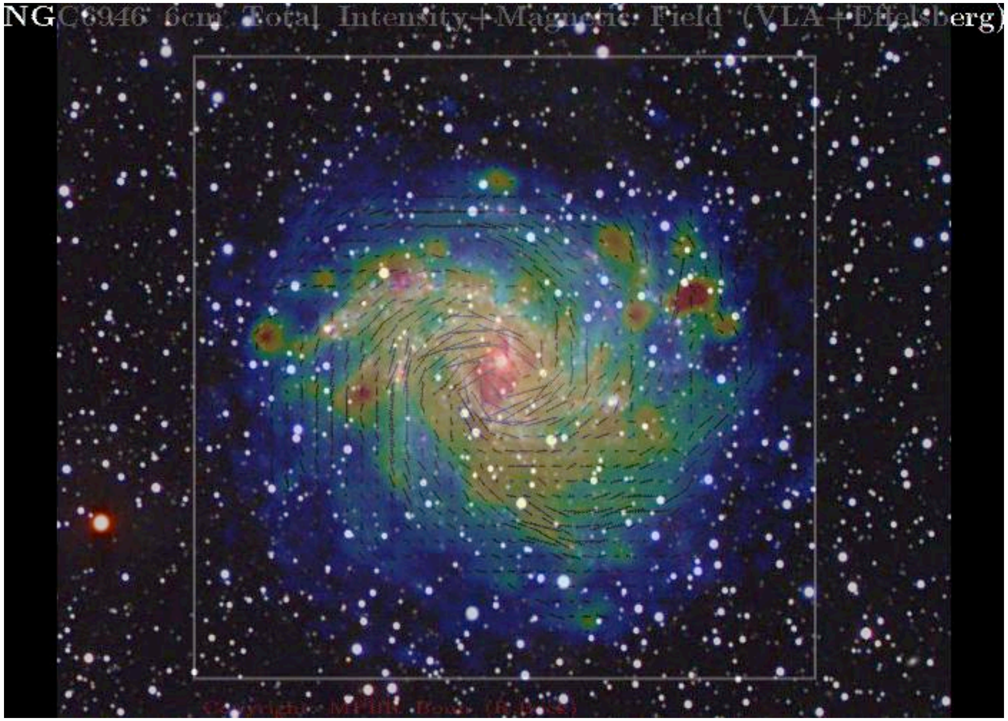
Joar Brynnel – 4MOST

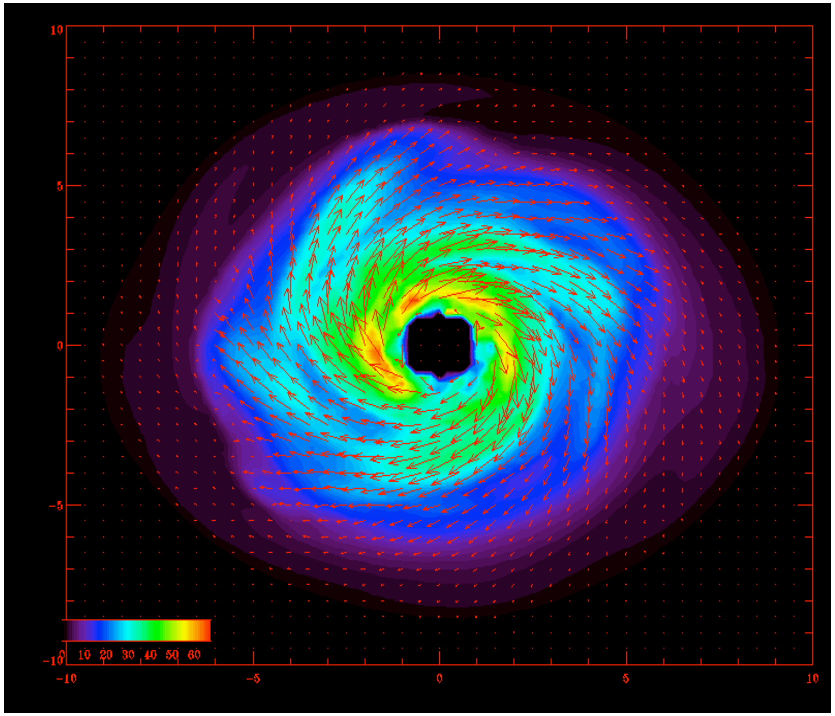
- ESO project, Paranal (VISTA)
- 15 MEur, 250 FTE (without operations)
- Consortium: AIP (PI), AAO, CRAL, LSW, MPIA, ESO, IoA, MPE, RuG, UH Finland, LU+UU, GEPI, UWA
- Schedule:
  - PDR 2015
  - FDR 2016-2017
  - MAIT 2018-2020
  - Commissioning; Operations

Detlef Elstner

e-Science

Galactic magnetic fields



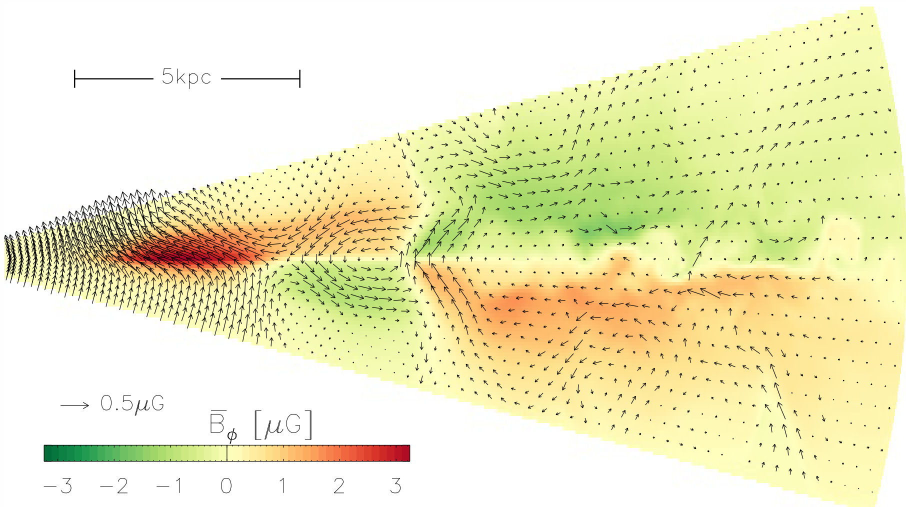


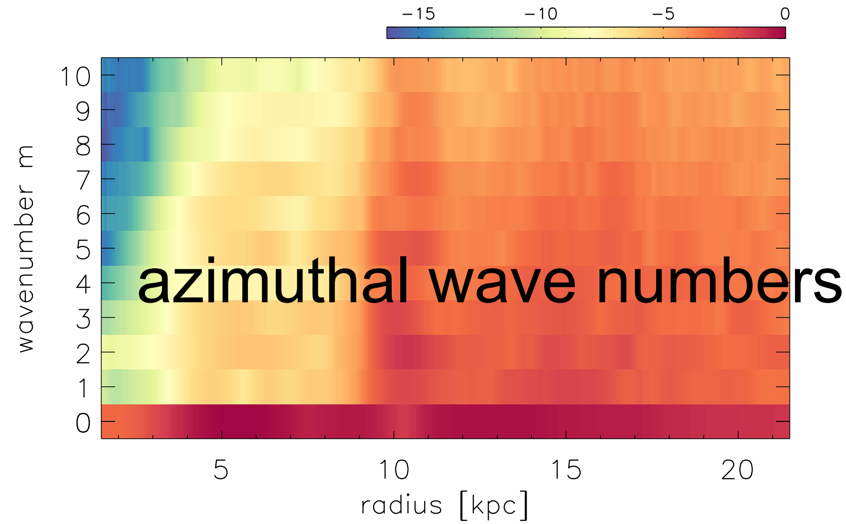
Coherent magnetic fields on scales of kpc.

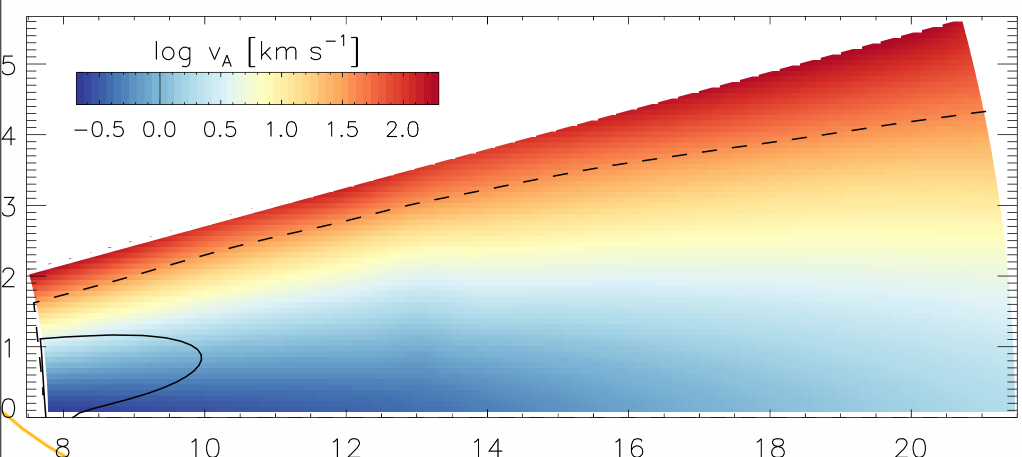
SN driven dynamo or Magneto-rotational instability ?

Simulations of ISM → dynamical mean field model

MRI in the outer part of Milky Way







MRI instability condition:

$$\sqrt{\frac{2-s}{s}\,\frac{\eta_t}{H}} \lesssim v_A \lesssim \sqrt{2s}\,H\Omega$$

$s=1$, $B_z=0.1\mu G$

Harry Enke

e-Science

Data Management in Surveys and Instruments

- RAVE Survey: Pipelining, Data Curation & Data Products
- MUSE: Concept & Implementation of Data Management, MUSEWise, CRE
- 4MOST: Data Management, CRE-Infrastructure
- Gaia: Participation in formation of CU9
- CLUES CRE for project
- APPLAUSE Digitisation & Catalogs of astronomical photo plates

Community Projects

- DFG Project Radieschen (General Set-up for Interdisciplinary Research Data Infrastructure), AIP in Steering Committee, 2011-2013
- DFG Project Sustainability of Virtual Research Environments, 2013 – 2014

Forschungsdaten-Infrastruktur

Community Work

- Organiser of Splinter E-Science & Virtual Observatory at AG Meetings since 2009
- AK Research Data of Leibniz Gemeinschaft, speaker since 2011
- SE TG Funding, formed in 2013

Infrastructure

- German Astrophysical Virtual Observatory (GAVO), 2003 – 2016
- AstroGrid-D, PM, 2005-2009
- WissGrid, Steering Committee, 2009-2011
- Virtual Data Center (BMBF, AIP)

Hardware

- EFRE (LOFAR Station, first deployment of WLAN + 10GB Backbone on Campus, 10GB Line to AEI)
- Grid-Hardware (Almagest Cluster, GridStorage Cluster, 10G line to ZIB)
- EFRE (Newton Cluster, Almagest 2.nd Gen, ….)
- each E&S hardware investment

EUROPÄISCHE UNION
Europäischer Fonds für Regionale Entwicklung
www.efre.brandenburg.de

Data Protection Commissioner (since 2013)

Programming: Perl, C, (python, C++, Fortran, Pascal,…)

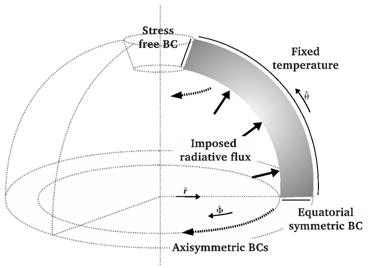
Yori Fournier

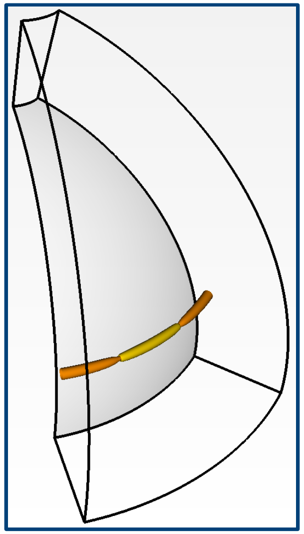
MHD

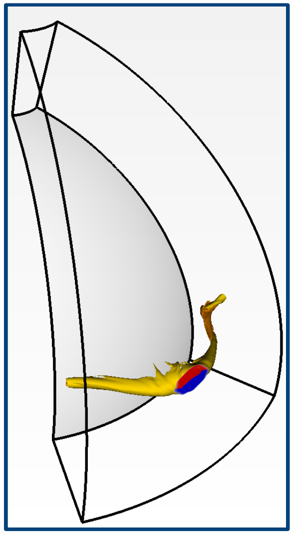
Studying rising flux tubes in low mass stars.

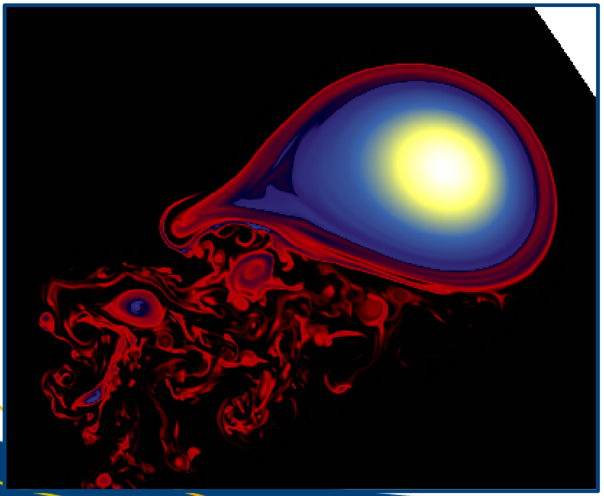
Yori Fournier
Rainer Arlt, Klaus G. Strassmeier

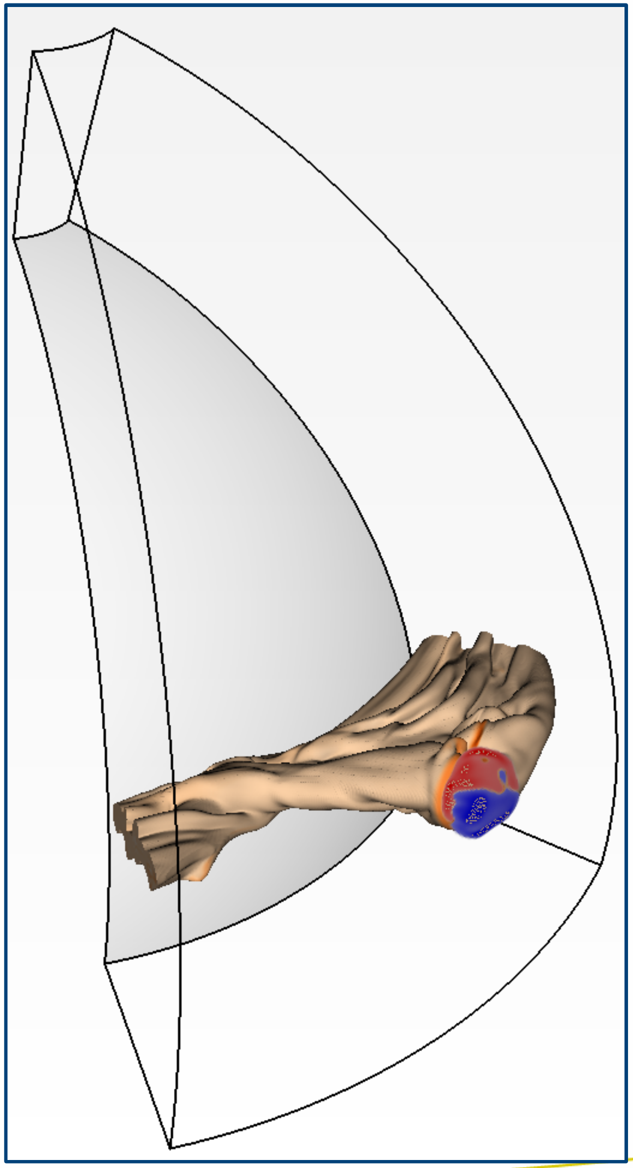
Leibniz-Institut für Astrophysik Potsdam (AIP)











We measure the properties of the rise from the simulation:

- Rising time, growth rate,
- Asymmetries, tilde angle,
- Dyn. evolution of density,velocity...

Studying flux tubes could help to:

- constrain the *activity-rotation relationship*,
- explain the *stellar cycle*, and the underlying *dynamo mechanism*,
- explain stellar *spots formation*.

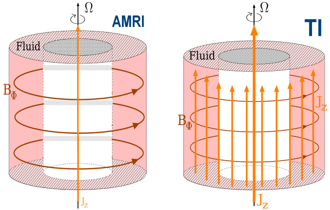
Marcus Gellert

MHD

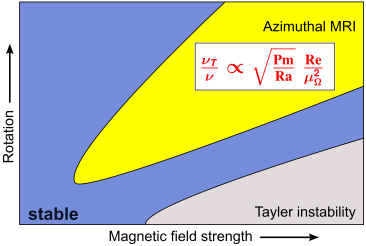
AIP

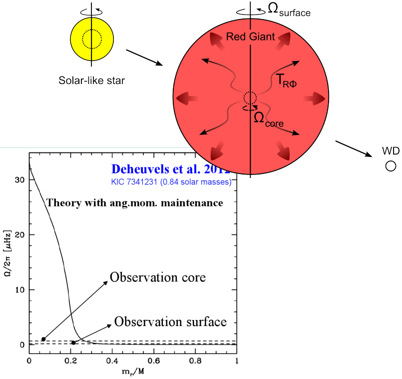
Magnetic field generation & magnetic instabilities

Field configurations:



Stability diagram:

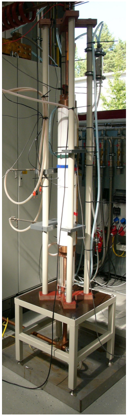


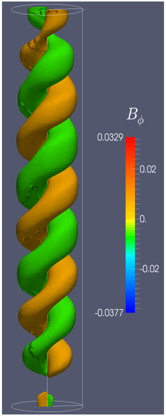


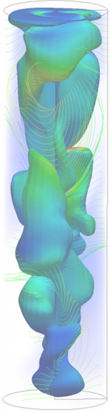
Explanation for slow stellar core rotation: enhanced angular momentum transport due to AMRI

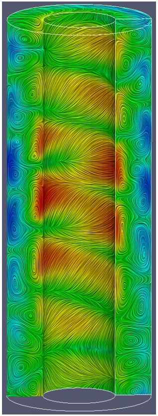
Laboratory astrophysics

Experiment suggestions and predictions by simulations









TI experiment

AMRI experiment

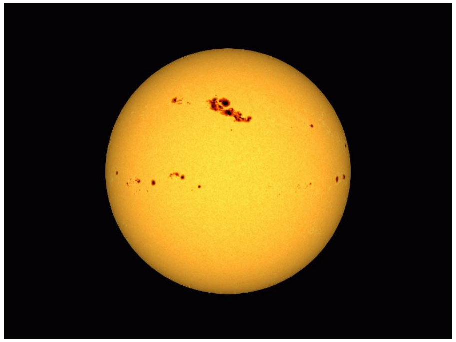
Gohar Harutyunyan

Stellar physics

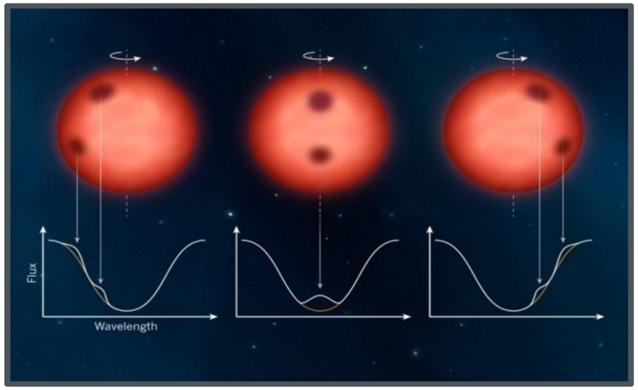
Doppler Imaging of Stellar Surfaces

PhD student (LGS)

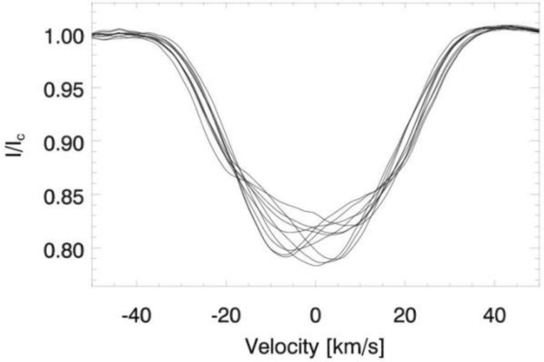
Prof. Dr. Klaus G. Strassmeier (AIP, advisor)
Dr. Michael Weber (AIP, co-advisor)



Credit: SOHO/MDI



(Showman 2014, Nature 505)



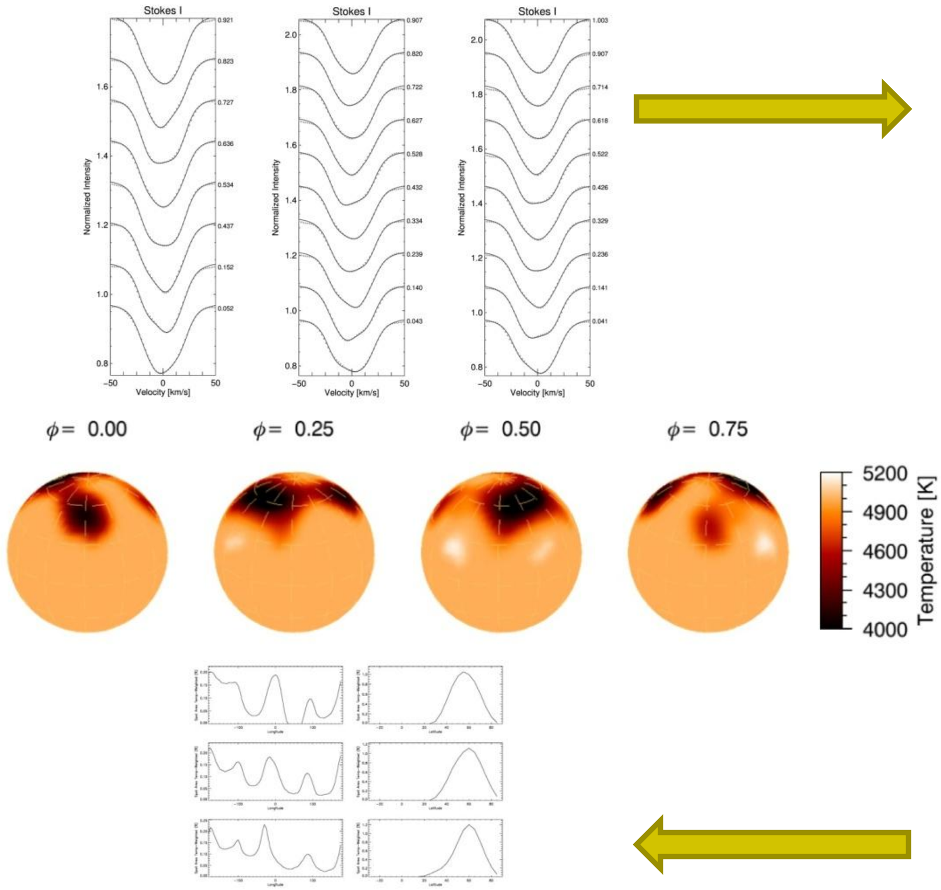
STELLA échelle spectrograph (SES)

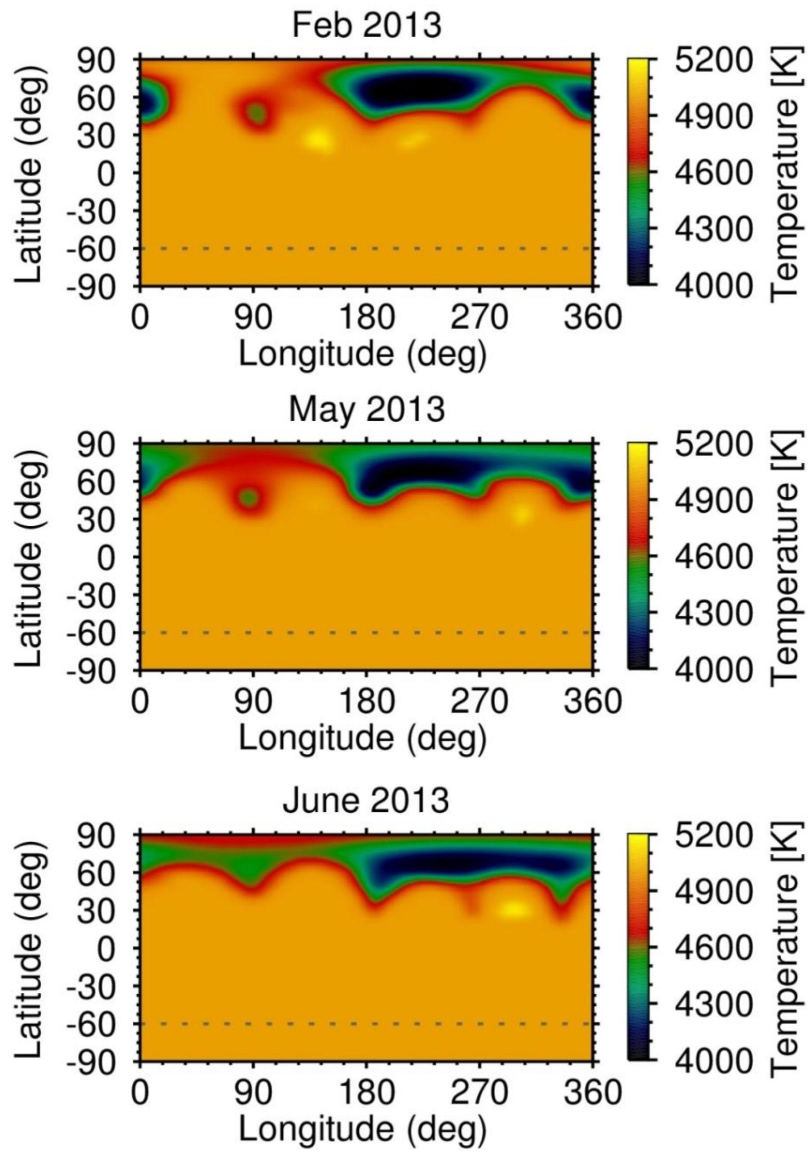
Surface temperature maps of HU Vir (K0 IV)

AIP

STELLA

iMAP **(Carroll et al. 2012)**

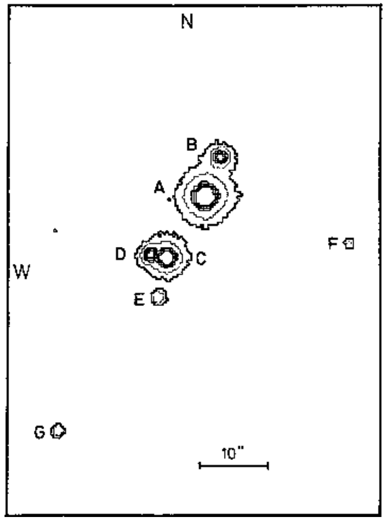


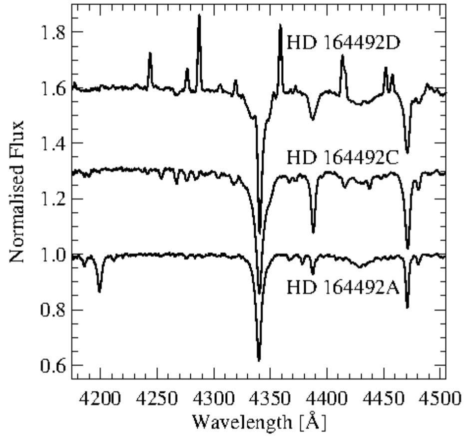


- starspot distribution, evolution and lifetimes
- differential rotation
- active longitudes
- …

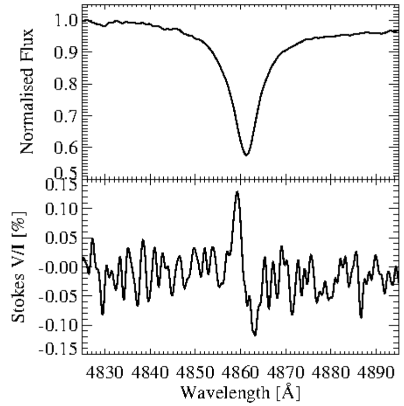
Swetlana Hubrig

Stellar physics





Magnetic fields in massive stars in the Trifid Nebula (observed in the framework of the ESO Large Program - the BOB collaboration)



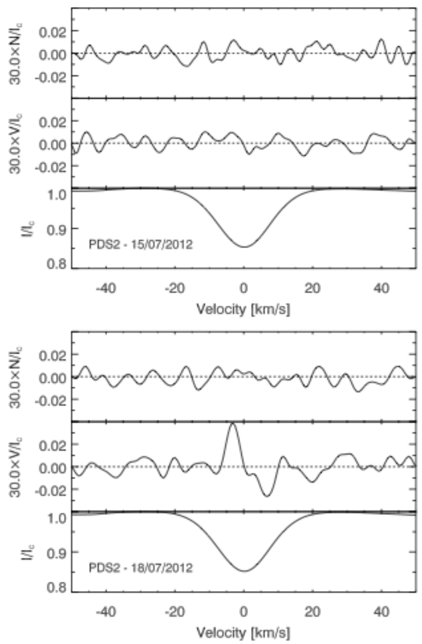


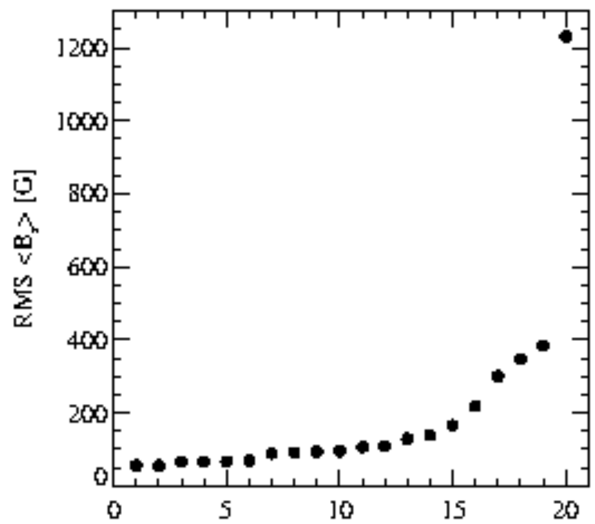
Fig. 3. *I*, *V*, and *N* SVD profiles obtained for PDS 2 on two different nights. The *V* and *N* profiles were expanded by a factor of 30 and shifted upwards for better visibility.

Table 2. RMS longitudinal magnetic field strength of late Herbig Be and Herbig Ae stars.

Name	Sp. T.	N	$\langle B_z \rangle$	References
PDS 2	F2	4	66	W07 H15
HD 31648	A3	8	385	A13 H07 W07 H11b
HD 36112	A5	3	89	W07 A13
HD 35929	F2	6	69	A13 W07
V380 Ori	A1	27	348	W07 W05 A09
BF Ori	A2	3	95	W07 A13
HD 58647	B9	1	218	H13
Z CMa	B9	1	1231	S10
HD 98922	A2	2	93	H13 W07
HD 97048	A0	20	109	H09 W07 H11b
HD 100546	B9	2	106	H09 W07
HD 101412	A0	17	300	H09 H11a W07 W05
HD 104237	A4	5	56	W07 D97 H13
HD 135344A	A0	2	91	A13 H09
HD 139614	A7	8	56	H07 A13 H09 W05
HD 144432	A7	6	67	H07 A13 H09 W07
HD 144668	A7	6	165	H07 A13 H09 W07
HD 150193	A1	16	139	A13 H09 H11b
HD 176386	B9	16	129	A13 H09 H11b
HD 190073	A1	16	66	H07 H09 W07 C07 H13

References: A09 – Alecian et al. 2009; A13 – Alecian et al. 2013; C07 – Catala et al. 2007; D97 – Donati et al. 1997; H07 – Hubrig et al. 2007; H09 – Hubrig et al. 2009; H11a – Hubrig et al. 2011a; H11b – Hubrig et al. 2011b; H13 – Hubrig et al. 2013; H15 – this paper; S10 – Szeifert et al. 2010; W05 – Wade et al. 2005; W07 – Wade et al. 2007.

Density distribution of the rms longitudinal magnetic field values for twenty Herbig Ae stars shows that only very few stars have rms fields stronger than 200G, and half of the sample possesses magnetic fields of about 100G and less.



Silva Järvinen

Stellar physics

Degrees:

- 2002 MSc
- 2007 Ph. Lic.
- 2009 Ph. D.

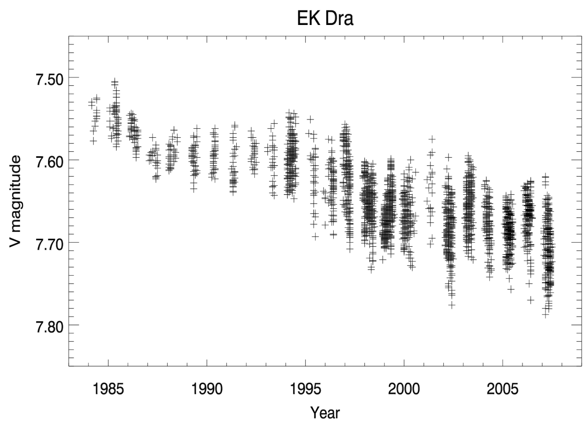
2007 - 2009

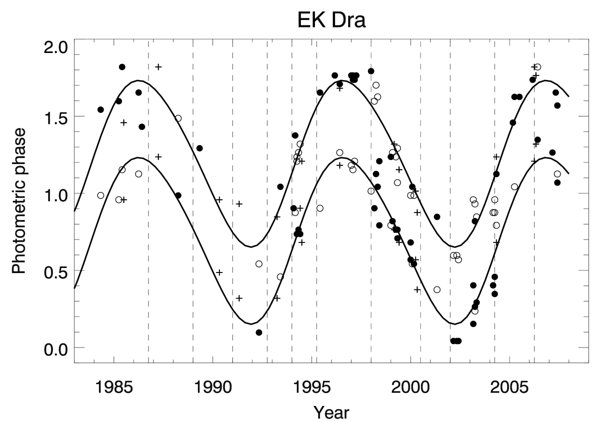
2004 ->

2003-2004

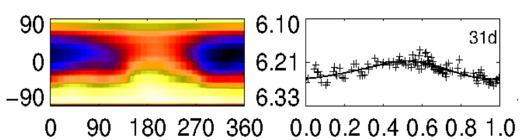
Stellar activity on solar-like stars

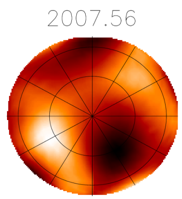
Activity cycles

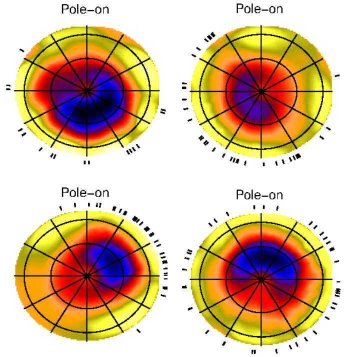


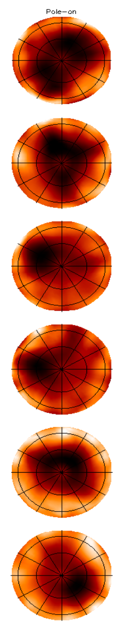


Stellar surface mapping

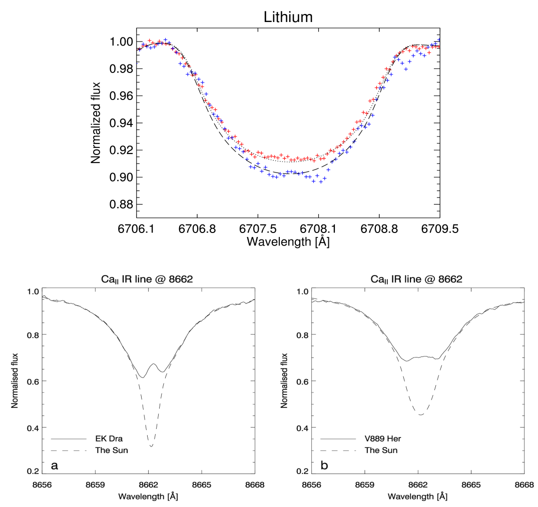




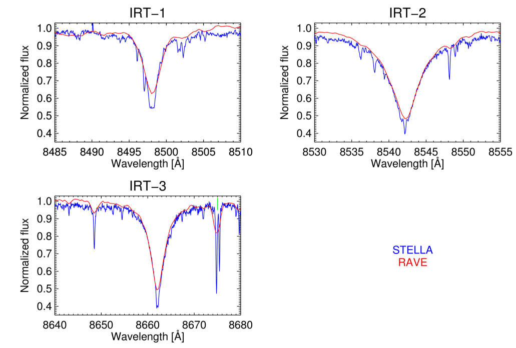




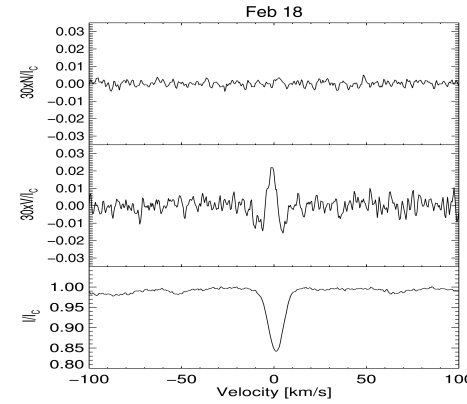
Activity indicators



Stella meets RAVE



Magnetic fields



Ondrej Jaura

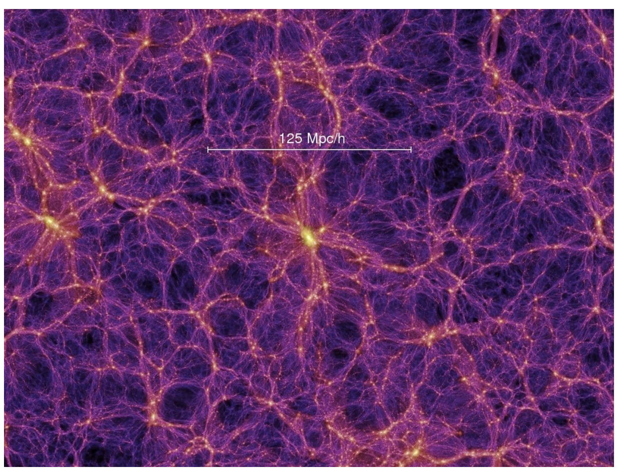
Cosmology

About me:

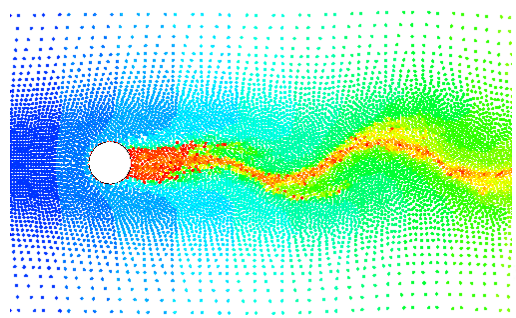
- Slovakia
- Master Physics at FU Berlin
- Master Thesis at AIP (Autumn 2014 – Autumn 2015)
- Galaxy Formation group (C.Scannapieco and P.Creasey)

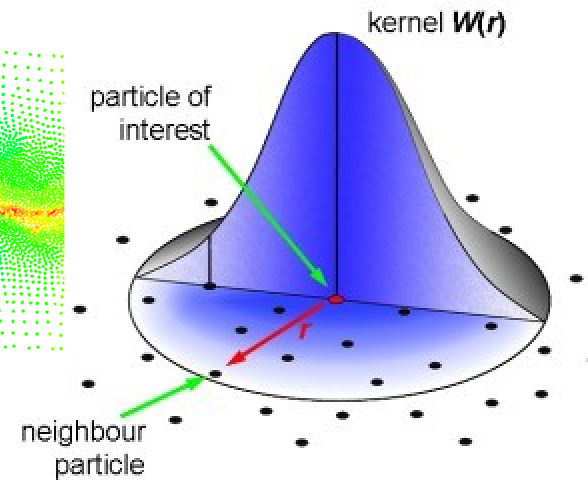
SPH – Smoothed Particle Hydrodynamics

- N-body Lagrangian method (alternative to grid methods)
- Particles are not points, but rather, a smeared-out distribution of density (Kernel W(r,h))
- Gadget 2, Gadget 3 codes for cosmological simulations



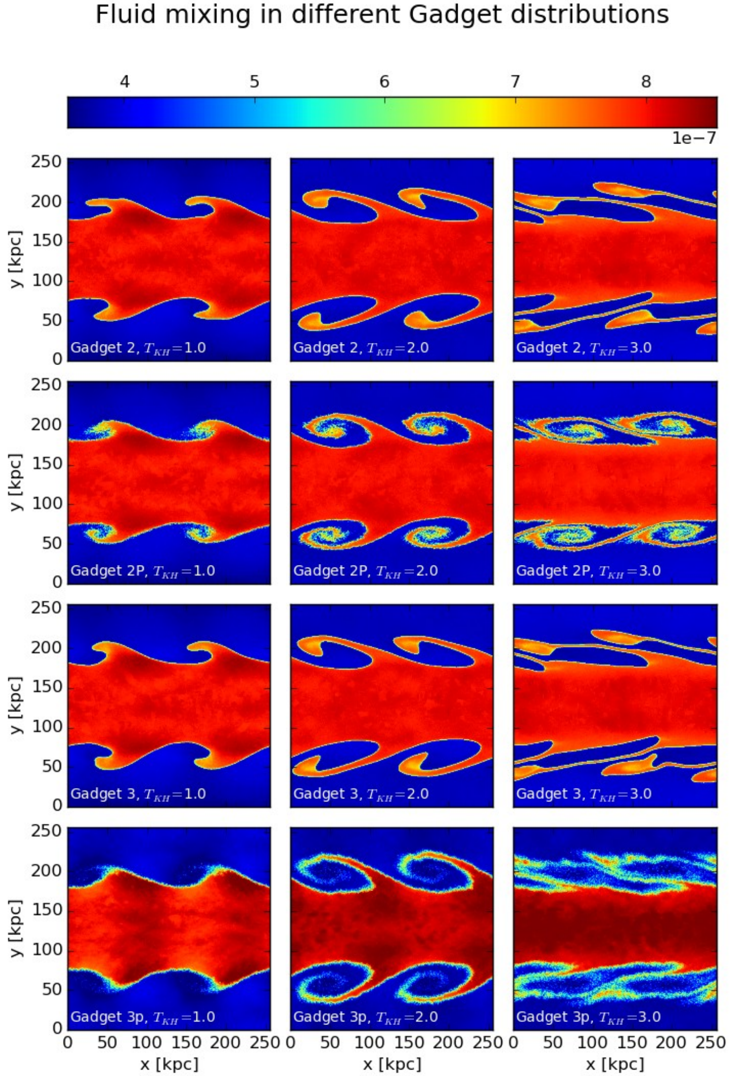
Credit: MPI Garching



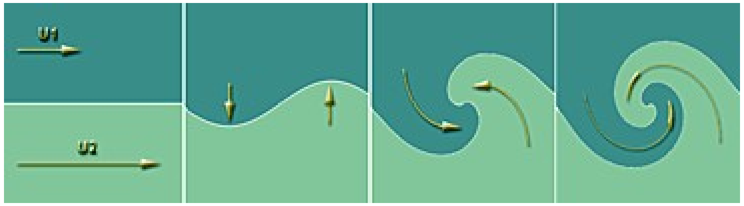


Credit: NUI, Galway, N.Quinlan

Fluid mixing in SPH simulations



Kelvin-Helmholtz Instability



Original: Density-Entropy
Pressure-Entropy formulation of SPH
(Hopkins 2012)

OSPH (Read 2010), SPHS (Read 2011)

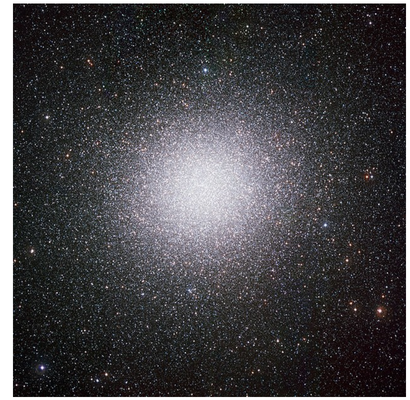
Josephine Kerutt

Galaxies

Leibniz-Institut für Astrophysik Potsdam

- Currently (still) Master's student

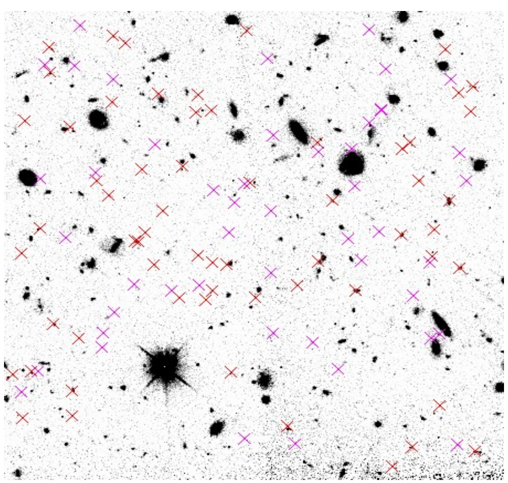
- Physics studies at UP since 2009
- Worked at AIP as student assistant
- Bachelor's thesis at AIP
- Master's thesis at AIP
- Future: PhD at AIP (LGS), starting probably January 2015

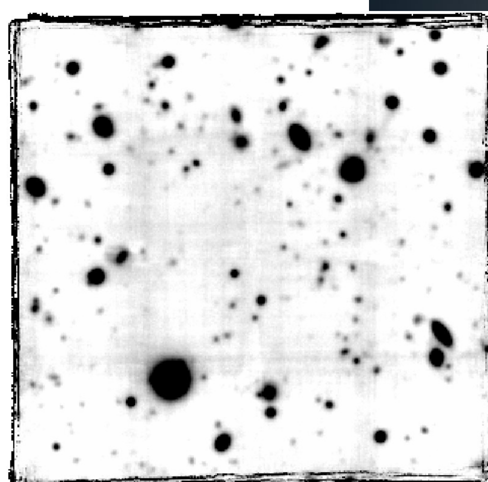


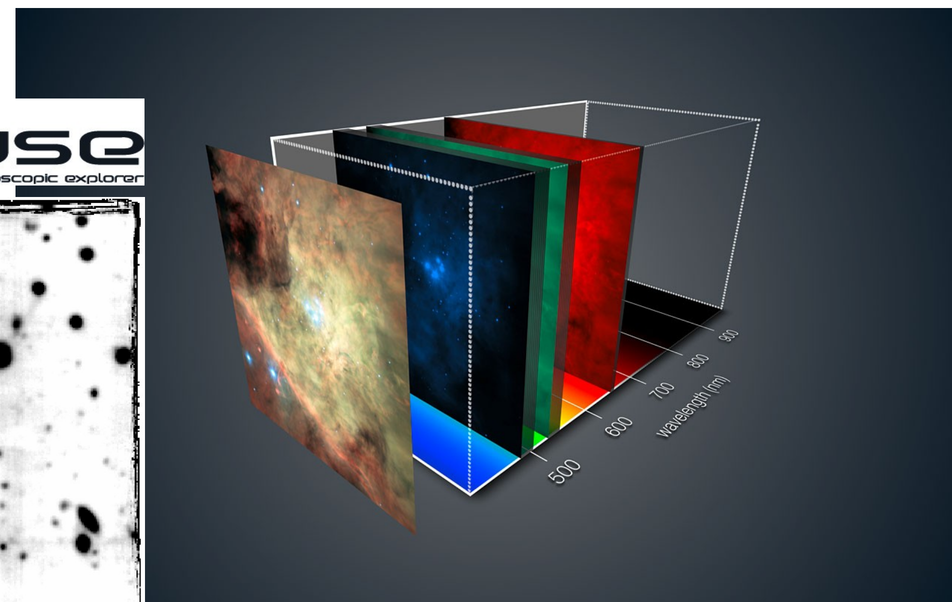
Universität Potsdam

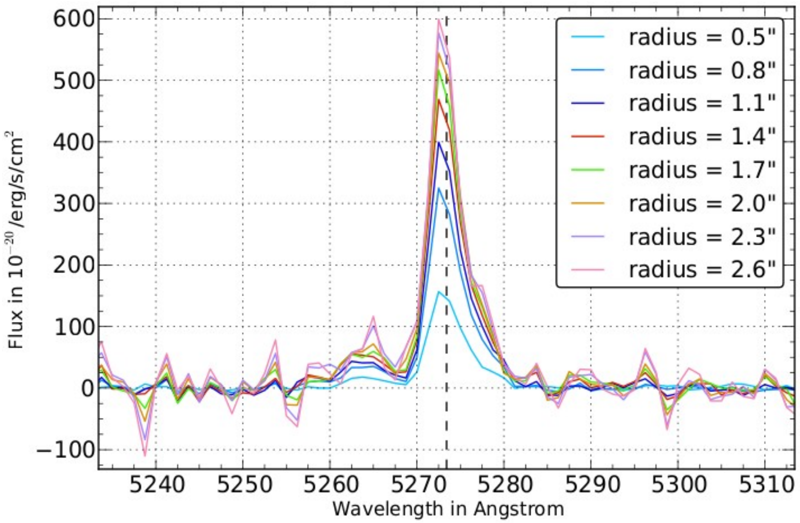
muse

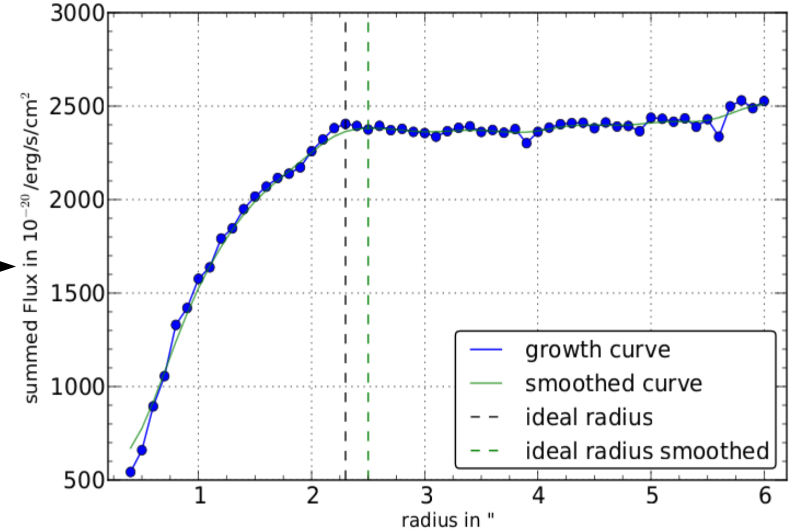
multi unit spectroscopic explorer

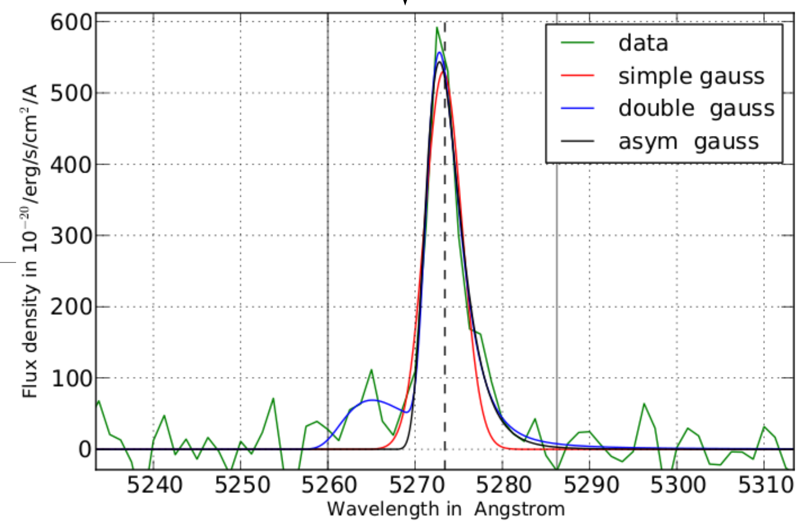


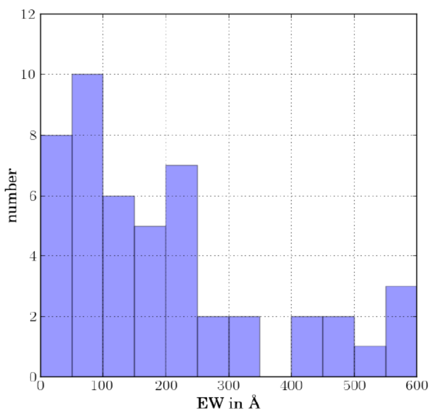




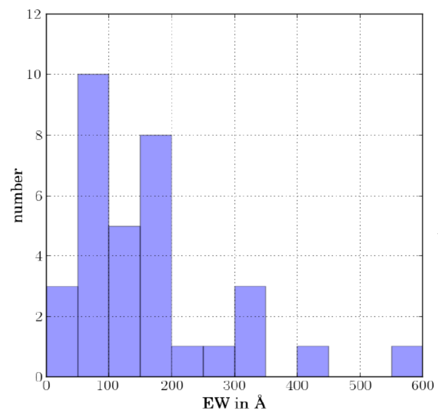








(a) With counterparts.



(b) Without counterparts.

HST data

Arman Khalatyan
e-Science

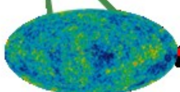
ARMAN KHALATYAN
SUPERCOMPUTING AND EDV (S&E)

GALAXY FORMATION AND EVOLUTION IN GAS-DYNAMIC NUMERICAL SIMULATIONS.

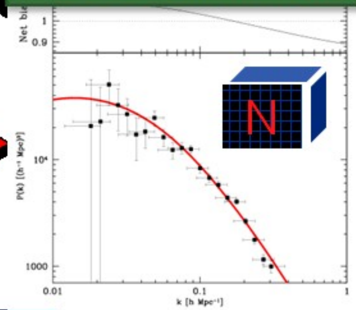
BIG-BANG

INFLATION

380 000 years



IC
MODEL: LCDM,WDM, etc



Ω_{tot}=1 (flat space time)

Baryons

Ω_0=0.3 (matter)

Ω_Λ=0.7 (Cosmological constant "Dark Energy")?

Baryons(!!!)

Dark Matter (?)

Stars
Gas

15%

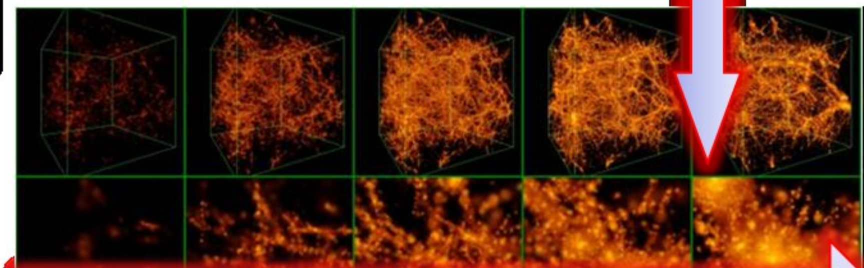
85%

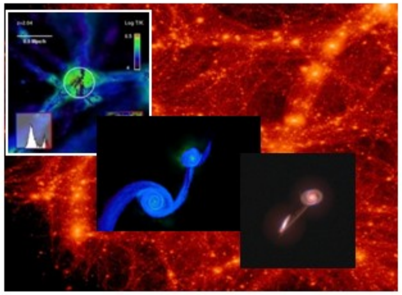
N-Body
+
Hydro

Gravity
N-Body

Research topics:
Galaxy formation
Hydrodynamics
AGN
Large scale structure
Parallel analysis
Visualization tools:
PMViewer, SPH2GRID

SUPER COMPUTERS





13.7 billion years in few months!!!

Research life made easy: newton/leibniz/cloud.aip.de

Maintain: 3000 cores 12TB main memory 3PB disk space 50Tflops

Leibnizhaus

Schwarzschildhaus

DMZ 2xIP

4xnodes
Cloud05
Cloud06
Cloud07
Cloud08

IB 2x56Gbit
4x10Gbit
1x1Gbit

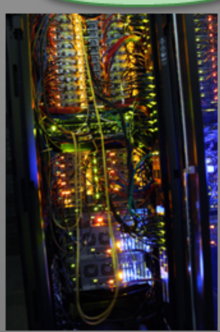
4xnodes
Cloud01
Cloud02
Cloud03
Cloud04

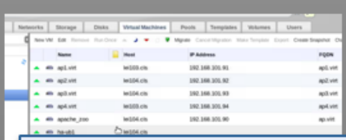
30TB ISCSI → oVirt ← ISCSI 30TB

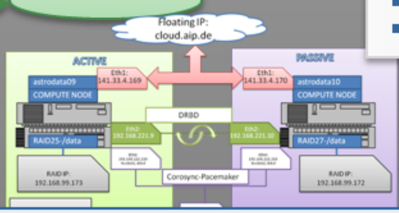
fast iscsi storage for user data

Zfs raid1x2Disks — replicated gluster for HA VM storage — raid1x2Disks

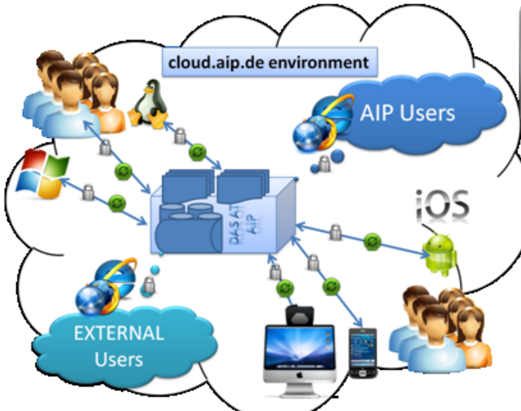
GluFS

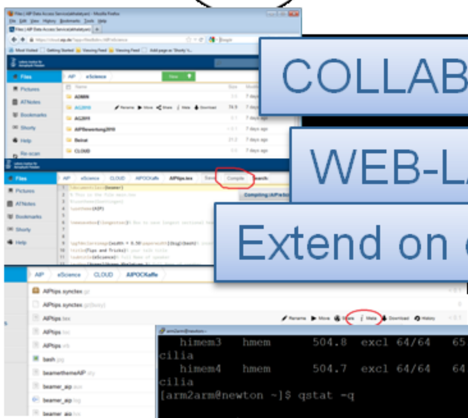






Hide complexity

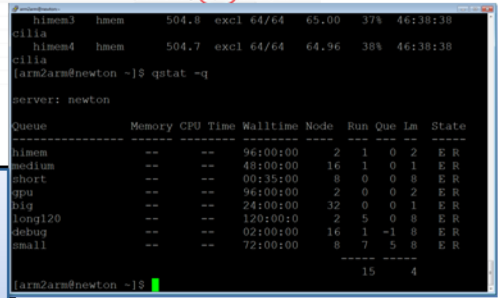




COLLABORATE

WEB-LATEX

Extend on demand



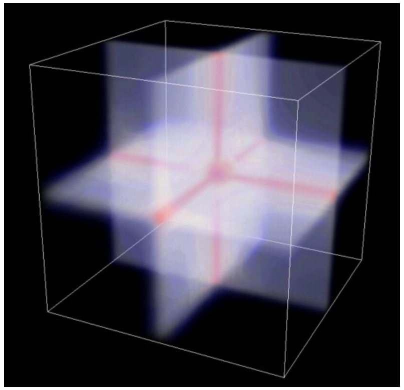
Contact: 528 Villa/33
cluster-adm@aip.de

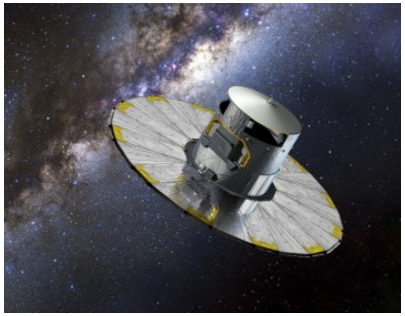
Jochen Klar

e-Science

The story so far …

- Master thesis: *The influence of baryonic cooling on the halo-configuration of the dark matter*
- PhD thesis: *A detailed view of filaments and sheets of the warm-hot intergalactic medium*
- since 2014: E-Science
- 2011-2013: *Rahmenbedingungen einer disziplin-übergreifenden Forschungsdaten-Infrastruktur (Radischen)*
- 2013-2014*: Erfolgskriterien für den Aufbau und nachhaltigen Betrieb Virtueller Forschungsumgebungen (DFG-VRE)*
- 2014: Gaia CU9





Things I know stuff about

- Cosmology: Hydro-Simulations, Warm-Hot intergalactic medium, Simulation codes, MPI, Fortan, C
- Programming: Python, PHP, JavaScript, CSS
- Frameworks: Zend, Django, bootstrap, AngularJS, d3
- Databases: MySQL, PostgreSQL
- Applications: Linux, git, WordPress
- Research data landscape, *forschungsdaten.org*
- Virtual (or Collaborative) Research Environments

Georges Kordopatis

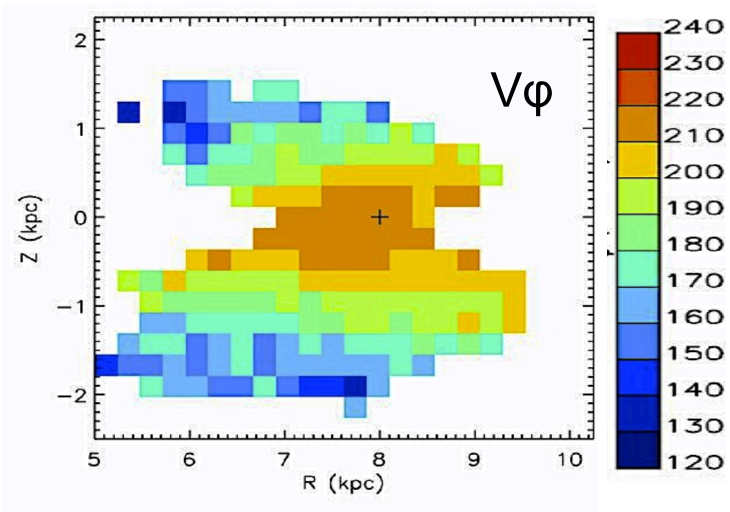
Milky Way and Local Volume

Georges Kordopatis

LH- 1-03

- Postdoc MW and local volume
  - PhD in Nice France
  - Before AIP: IoA, Cambridge
- Expertise: Galactic archaeology (Mostly observational)
  - MW structure formation
    - Thin and thick disc,

    but also bulge, halo and dSph
  - Spectra parameterisation
  - Stellar distances



Georges Kordopatis

LH- 1-03

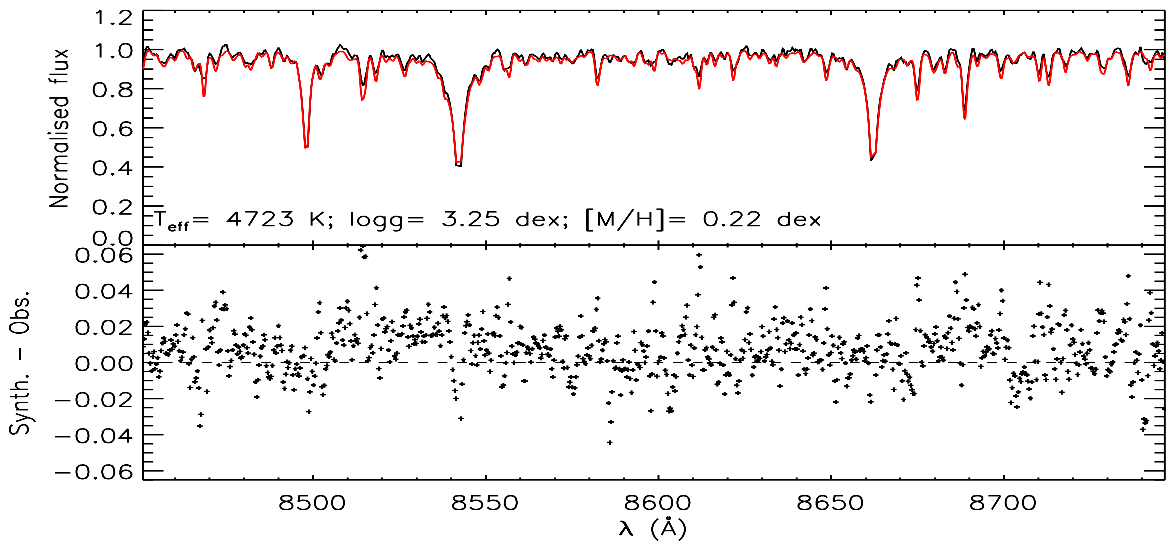
Big projects implications:

-**RAVE**: ~everything

- **Gaia-ESO survey**: science user & distance determination

- **Gaia**: Validation of the stellar parameters with RVS

- **4MOST**: stellar parameter pipelines

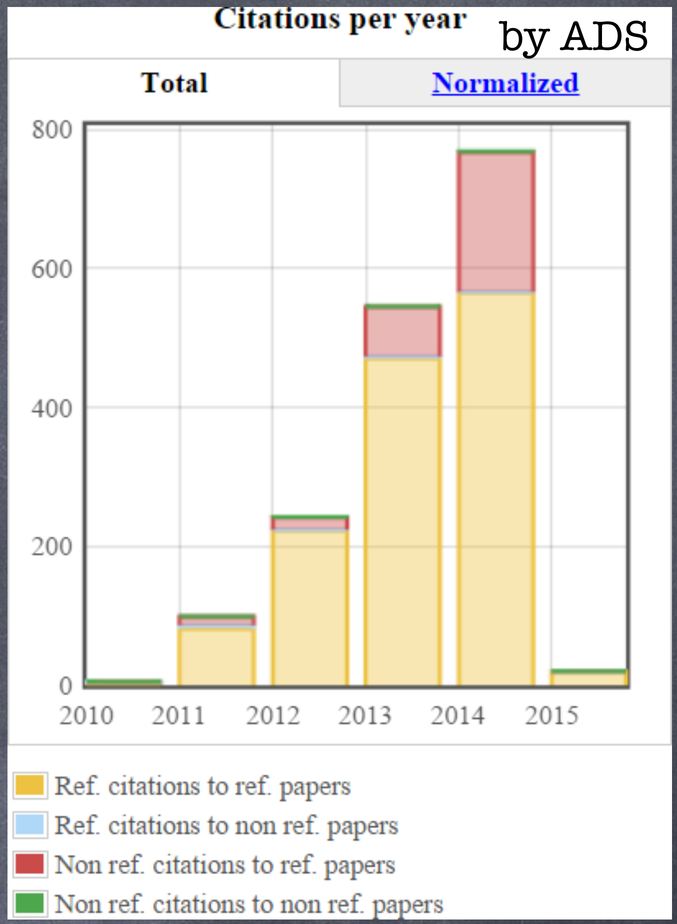


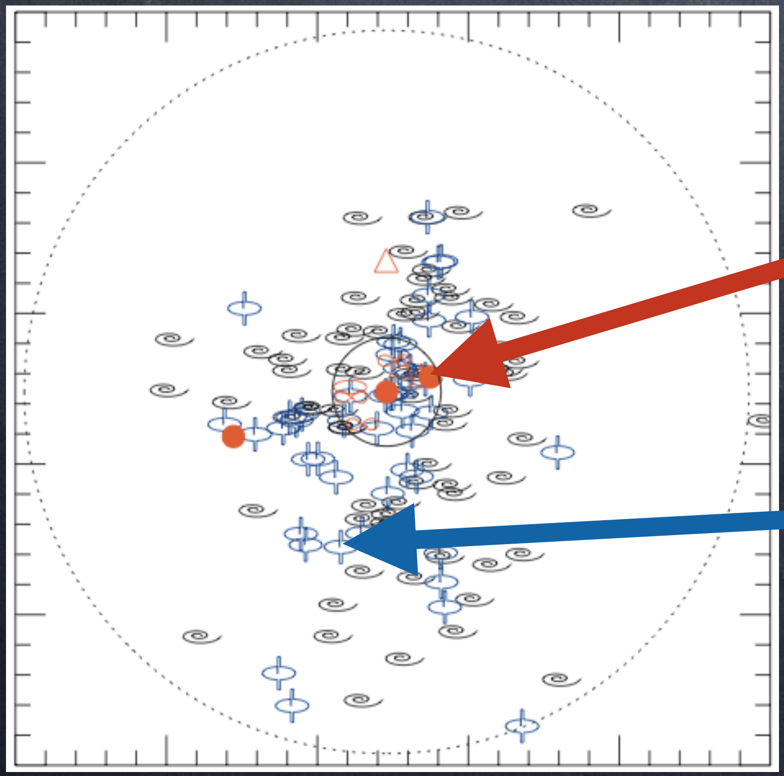
Davor Krajnovic

Galaxies

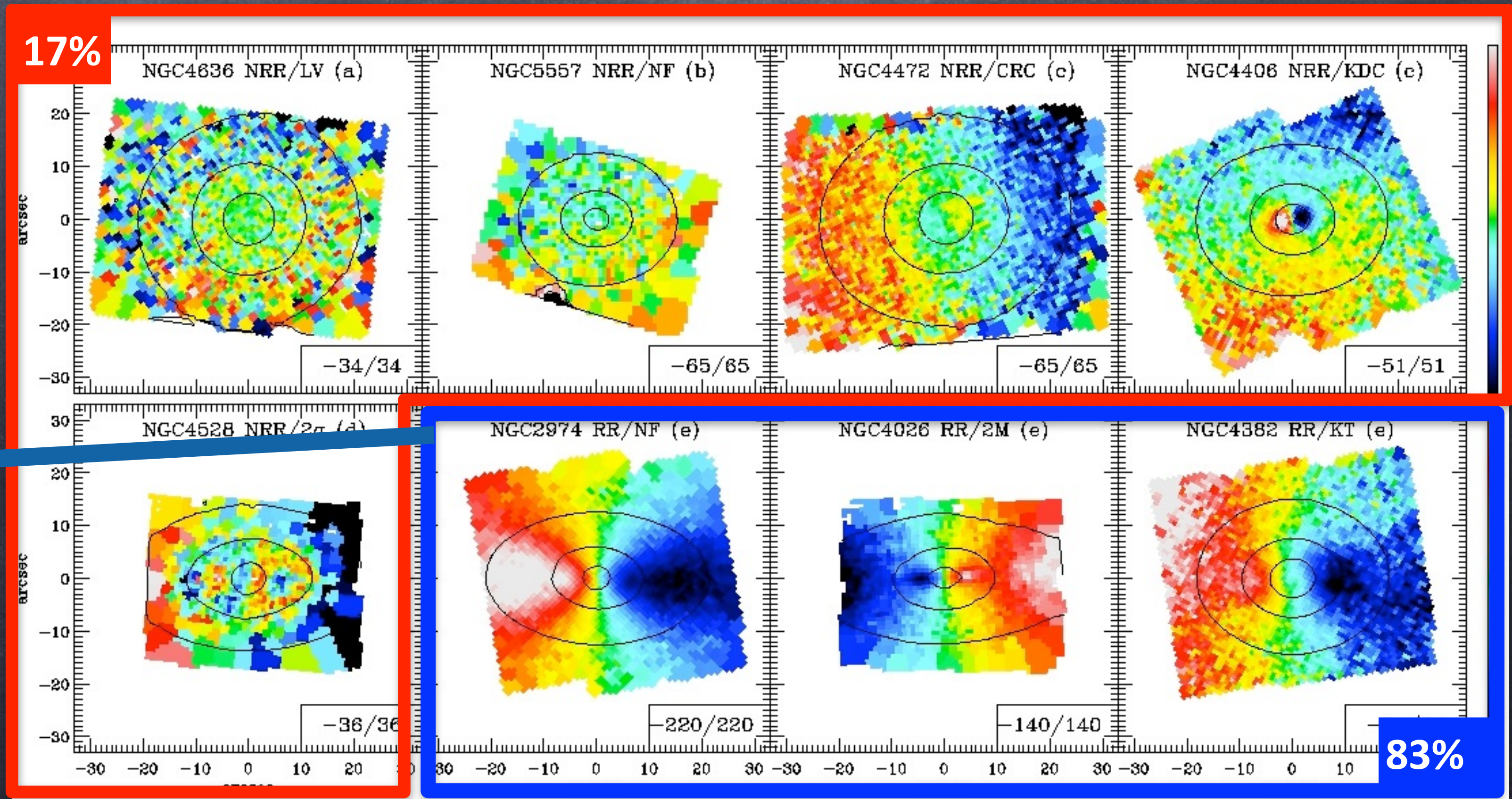
ATLAS^{3D} survey

- PIs: (Emsellem, Cappellari, **Krajnović**, McDermid)
- 260 nearby early-type galaxies within 42 Mpc
- no colour cut, only morphological classification
- observed with: optical-IFU, radio, millimeter arrays, deep imaging
- 2008 - 2014; 40+ papers



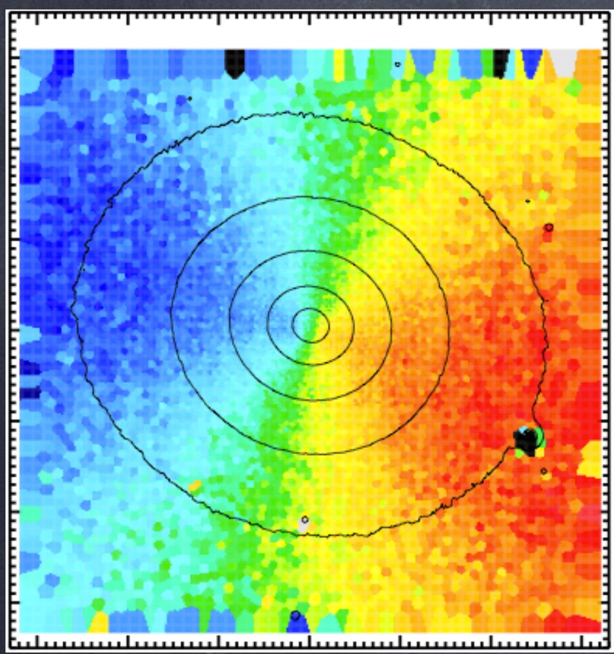


Krajnović et al. (2011)

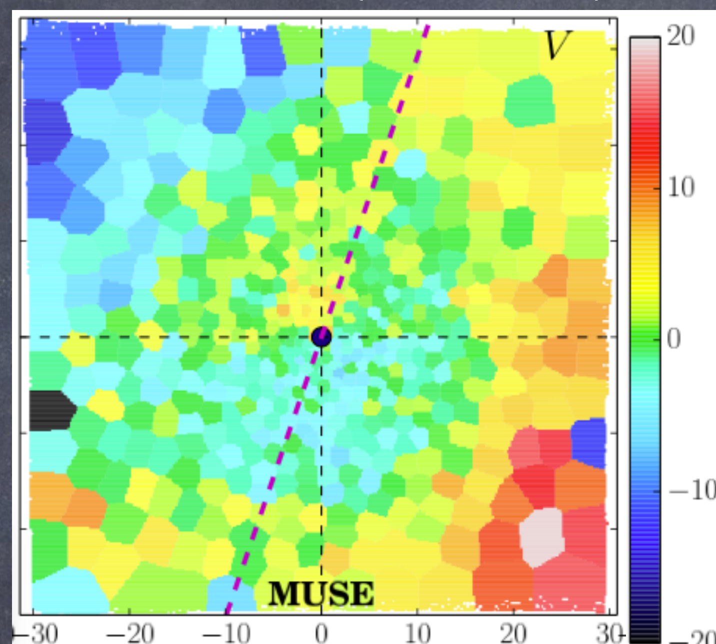


MUSE - Massive galaxies and their twisted nature

normal (boring)

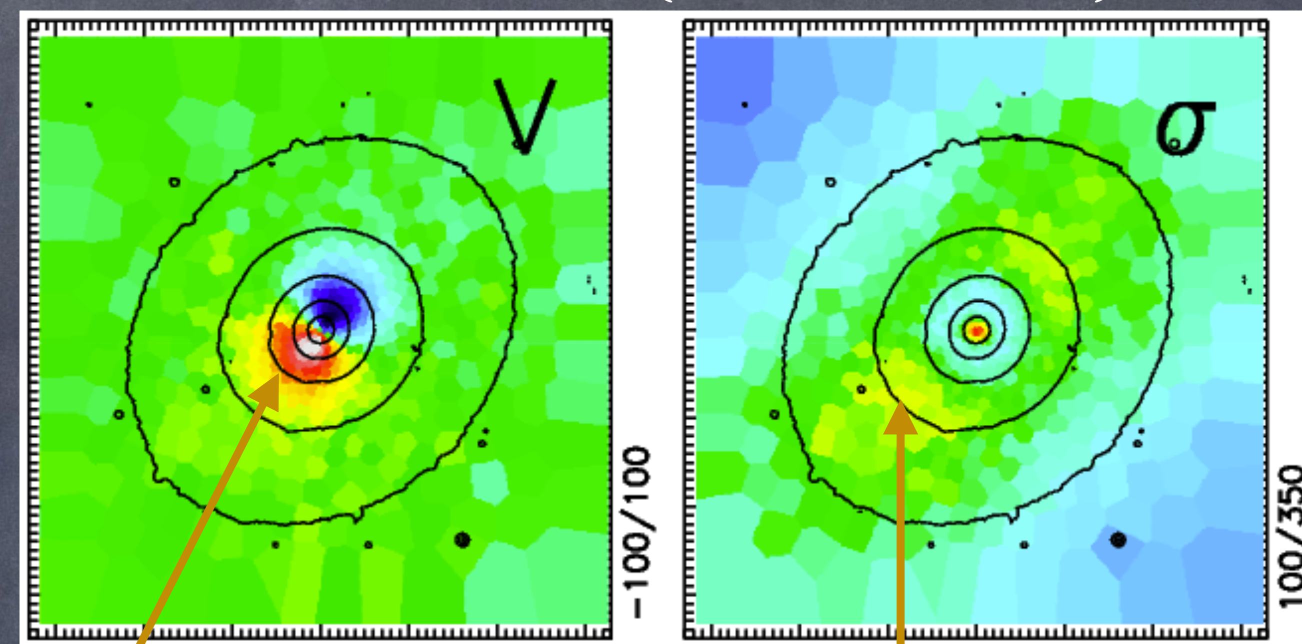


exciting (but rare)

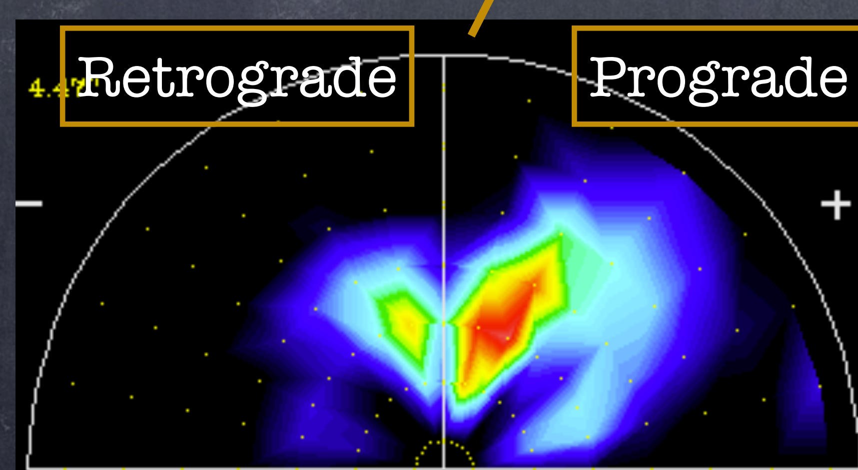


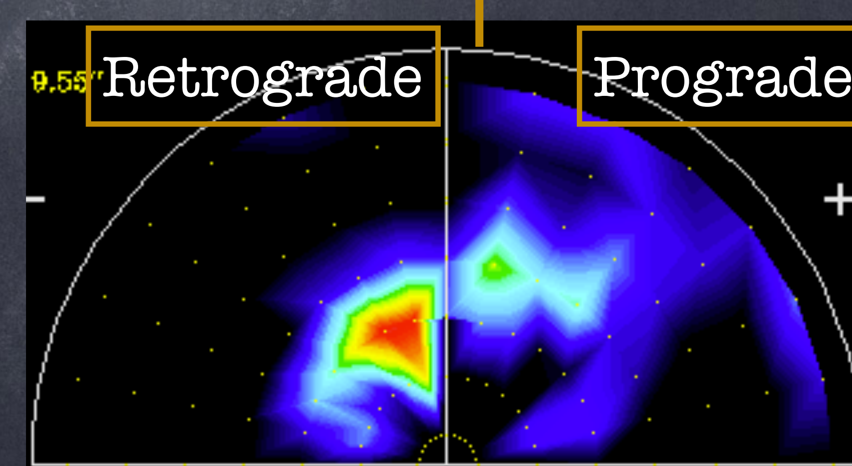
Emsellem, Krajnović, Sarzi (2014)

even more fun (I understand it)



Krajnović & MUSE team (in prep.)





- I also like:
  - kinematics and dynamics (stars, gas)
  - estimating masses of black holes (in galaxies)
  - assembly of mass (observations)
  - chocolate & tea

Manfred Küker

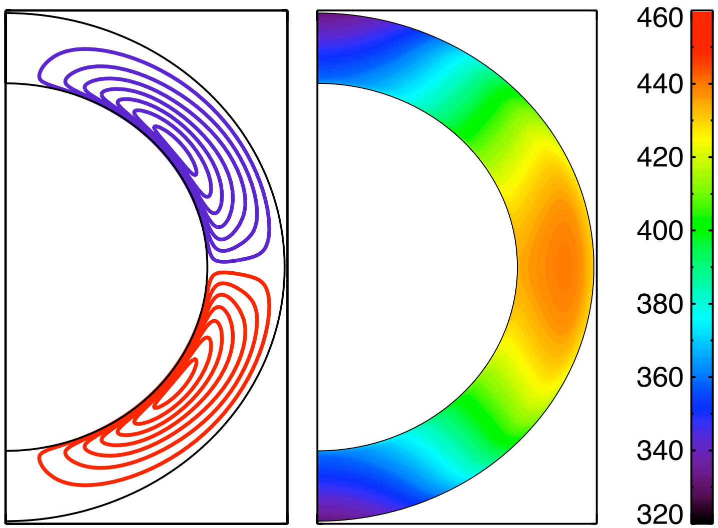
MHD

Mean field MHD

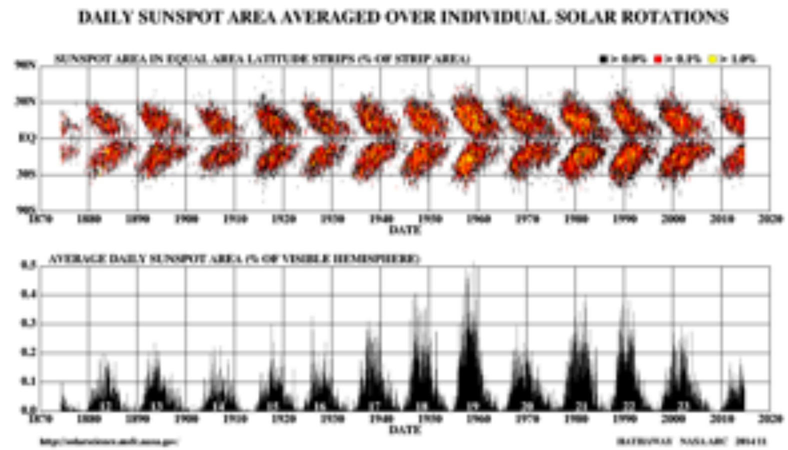
What is the mechanism that drives large-scale stellar activity?

Solar and stellar dynamo theory

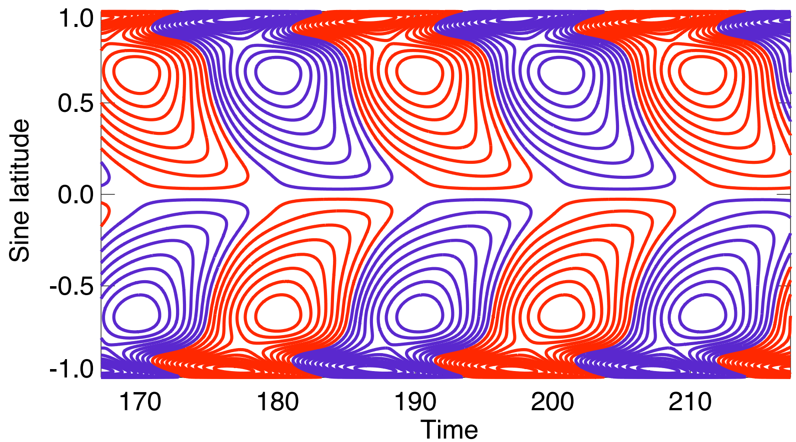
Stellar differential rotation



mean field model of solar internal rotation and meridional flow



solar butterfly diagram



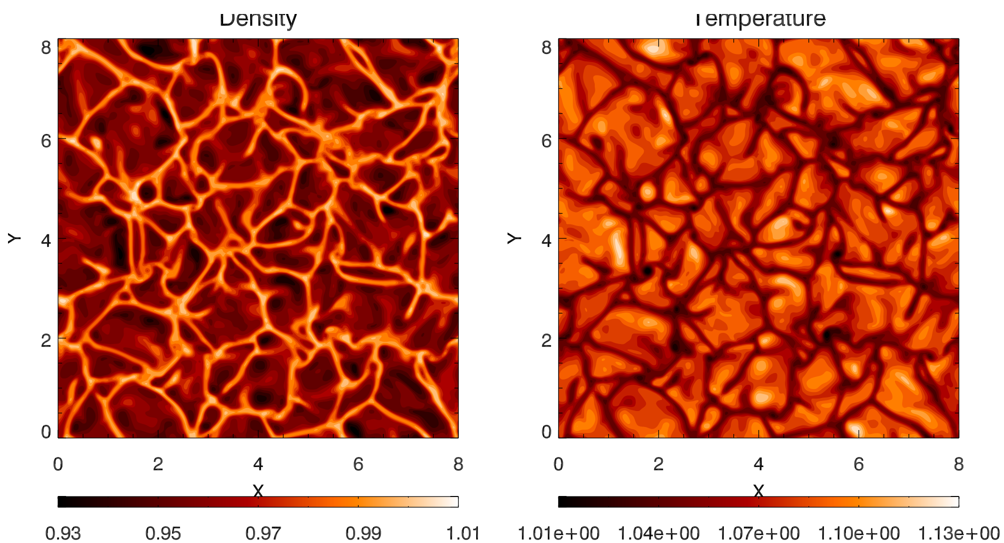
Direct numerical simulations

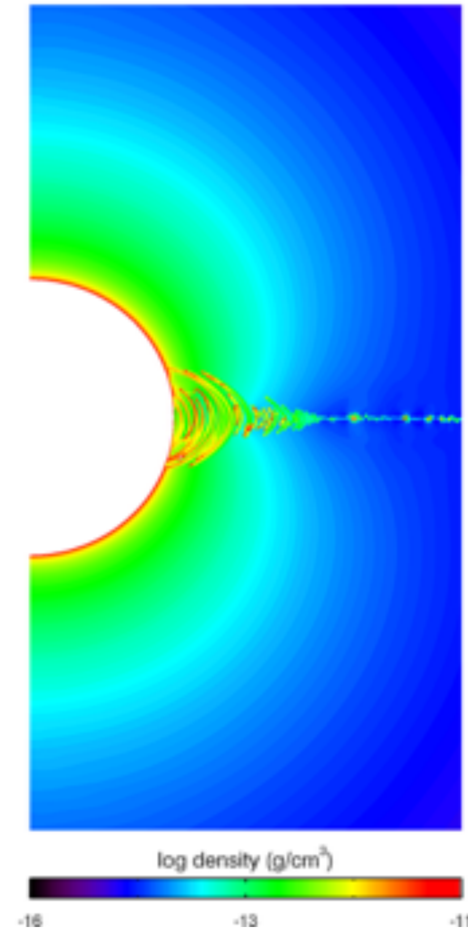
Test predictions of mean field theory

Measure transport coefficients

Global simulations: large-scale models

3D Box simulation of stratified convection





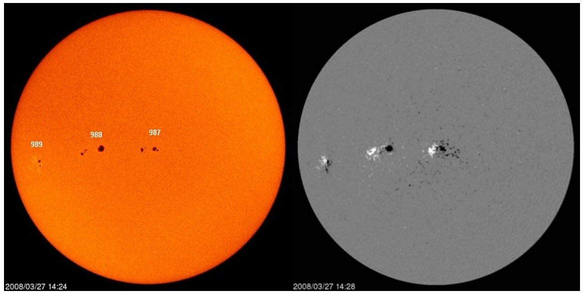
line-driven wind and magnetosphere of a massive star

Andreas Künstler

Stellar Physics

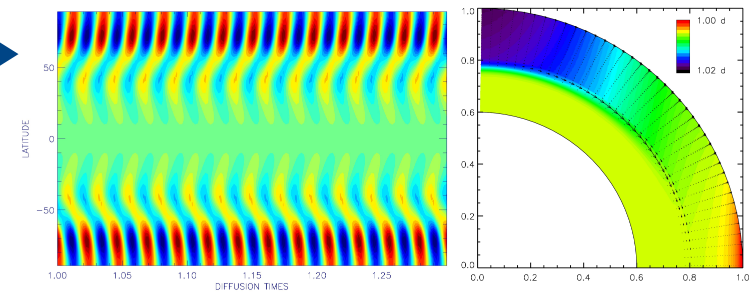
Spot evolution on the K-giant XX Tri

Andreas Künstler, Stellar Physics and Stellar Activity

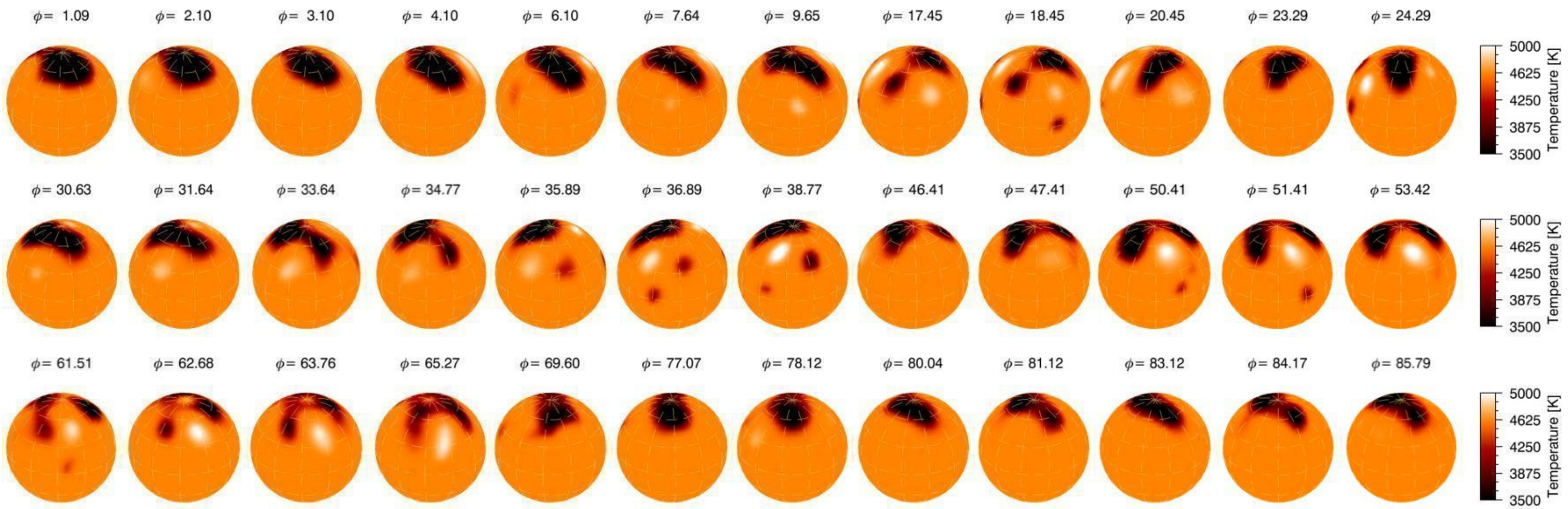


Sun – the comparison target

Solar-stellar connection



MHD – constraints for simulations



Uncover spot evolution over 85 rotations with Doppler imaging using 6 years STELLA spectra

Spot evolution on the K-giant XX Tri

Andreas Künstler, Stellar Physics and Stellar Activity

Spot distribution
high latitudes

Active longitudes
facing companion

Flip-flop
2-yrs cycle

Differential rotation
solar-like
a tenth of the sun's
alpha = 0.016

Scientific research:

- Spot distribution
- Spot evolution
- Active longitudes
- Flip-flop
- Differential rotation
- Activity cycles

Spot area evolution
linear decay / formation
<decay> = -0.022 SH/day
<growth> = +0.021 SH/day
max. area = 10 SH

Comparing sunspots
<decay> = 4.2×10^{-6} SH/day
max. area = 10^{-3} SH

Activity cycle
Photometry: 28 yrs
Spot decay: 26 yrs

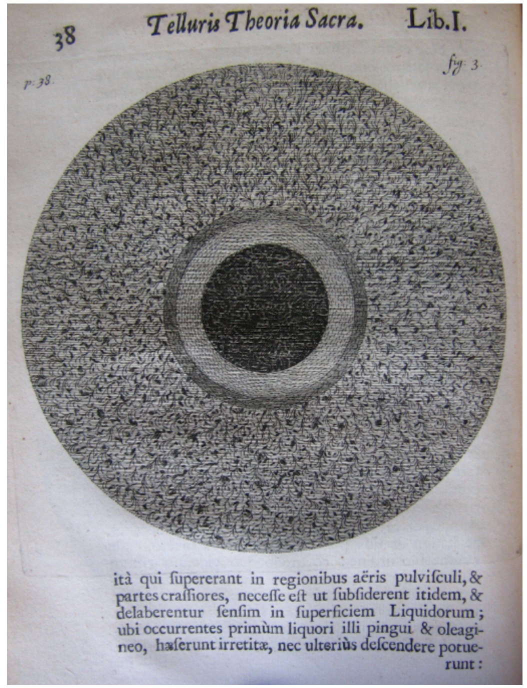
For the first time:
Starspot decay predicts an activity cycle

Noam Libeskind

Cosmology

Noam I Libeskind

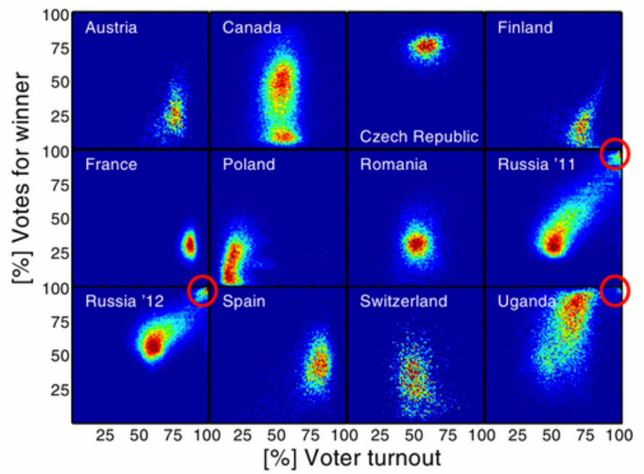
- From the USA – did my University: BSc UCL, Masters Cambridge, PhD Durham
- Interested in map projections and history of science
- Teaching: U Potsdam (GR, cosmology, early universe), Humboldt University (Introduction to Astronomy)



38 *Telluris Theoria Sacra.* Lib.I.

ità qui ſupererant in regionibus aëris pulviſculi, & partes craſſiores, neceſſe eſt ut ſubſiderent itidem, & delaberentur ſenſim in ſuperficiem Liquidorum; ubi occurrentes primùm liquori illi pingui & oleagineo, hæſerunt irretitæ, nec ulteriùs deſcendere potuerunt:

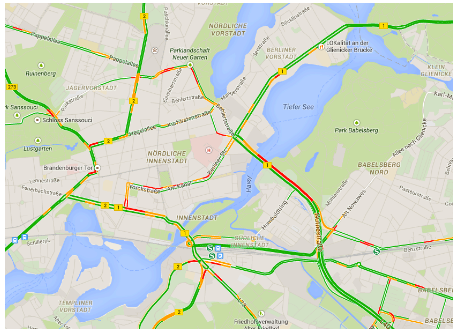
- Research: numerical simulations, galaxy formation, Large-scale structure, satellite galaxies, dwarfs, the local group, Andromeda, the Milky Way

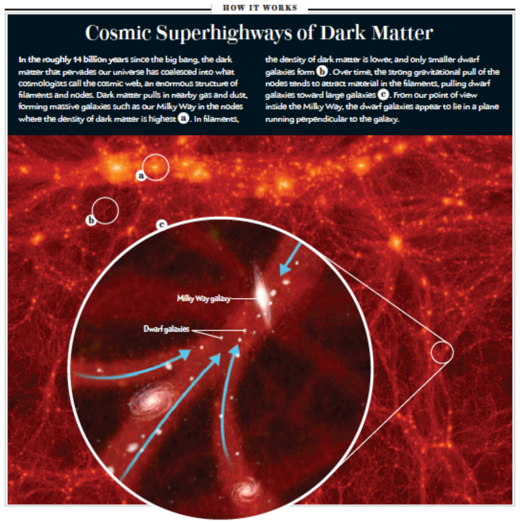


Klimek et al 2012

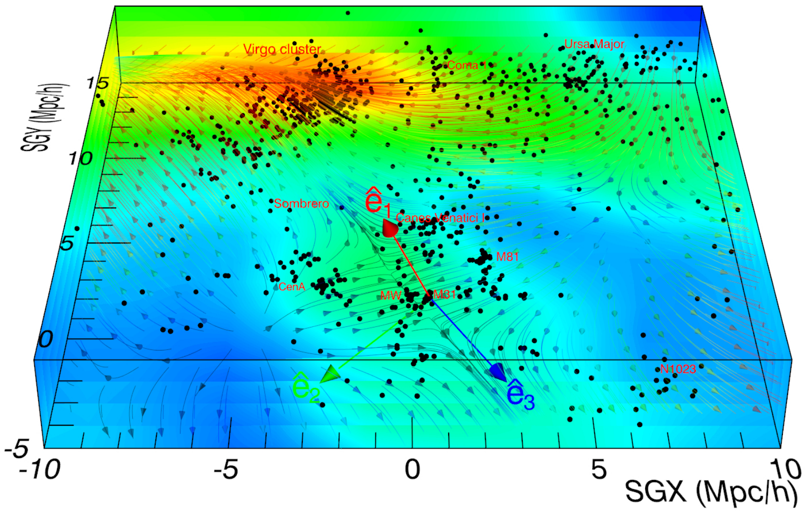
Research

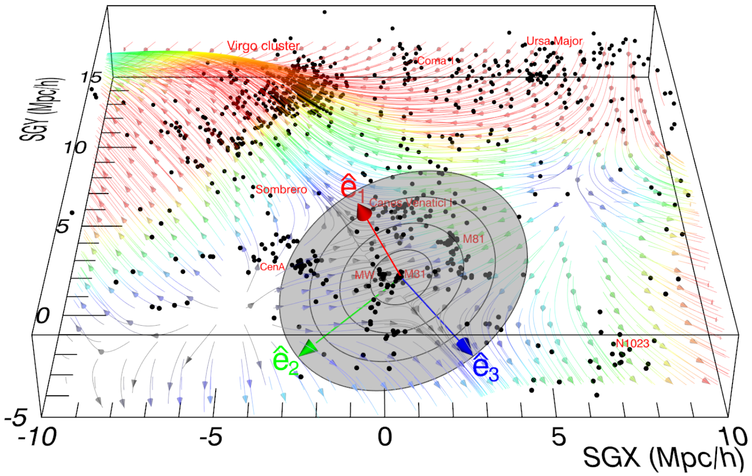
Examining in the world around us by looking at galactic traffic





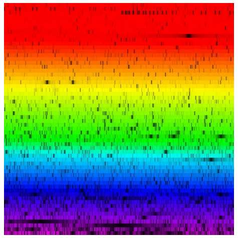
What role does the local velocity field play in the formation of the Milky Way, the Local Group and the dwarfs that inhabit it?





Adriane Liermann

Stellar Physics



Leibniz Graduate School
Quantitative Spectroscopy in Astrophysics

Coordinate PhD curriculum activities:

- Seminars:

„Career perspectives in Astrophysics“

„Scientific Writing in Astrophysics“

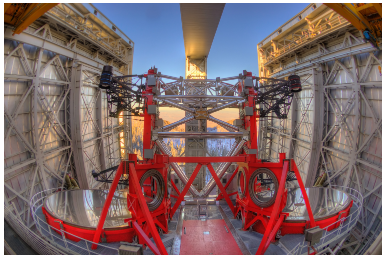
- DAAD Deutscher Akademischer Austausch Dienst German Academic Exchange Service

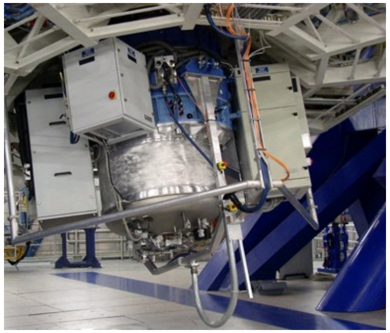
Structured PhD training in Astrophys.:

- Implement new PhD regulations @AIP
- Thesis committees + progress meetings
- AIP's PhD statistic

Summer BBQ meeting with all students (06/2014)

Evolution of high-mass stars @ Stellar physics group





What:

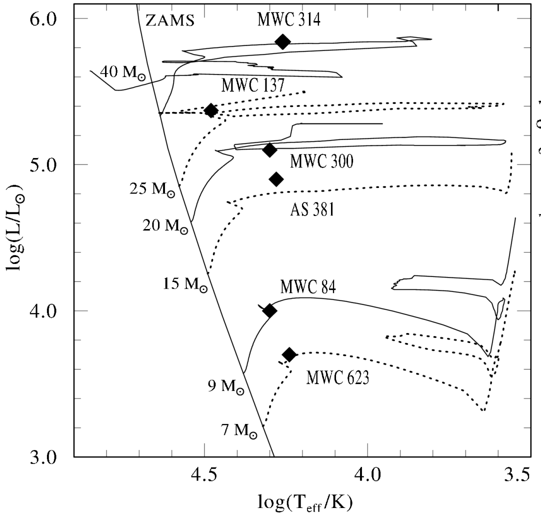
Study high-mass stars in stellar clusters, in isolation,...

Why:

Understand mass loss and evolution of high- mass stars

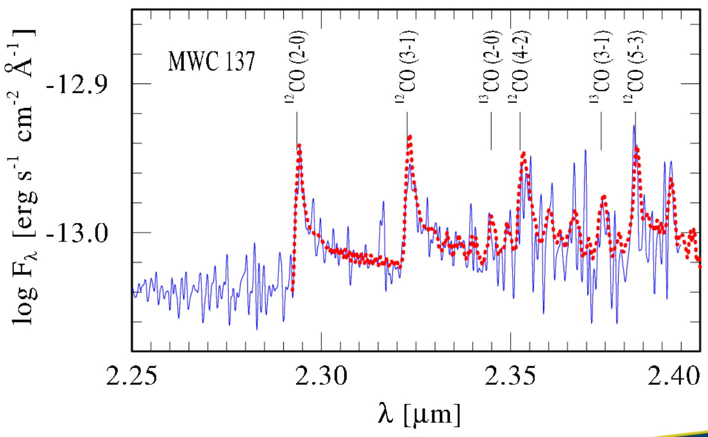
→ fast feedback: enriched material, energy, momentum

→ chemical evolution MW



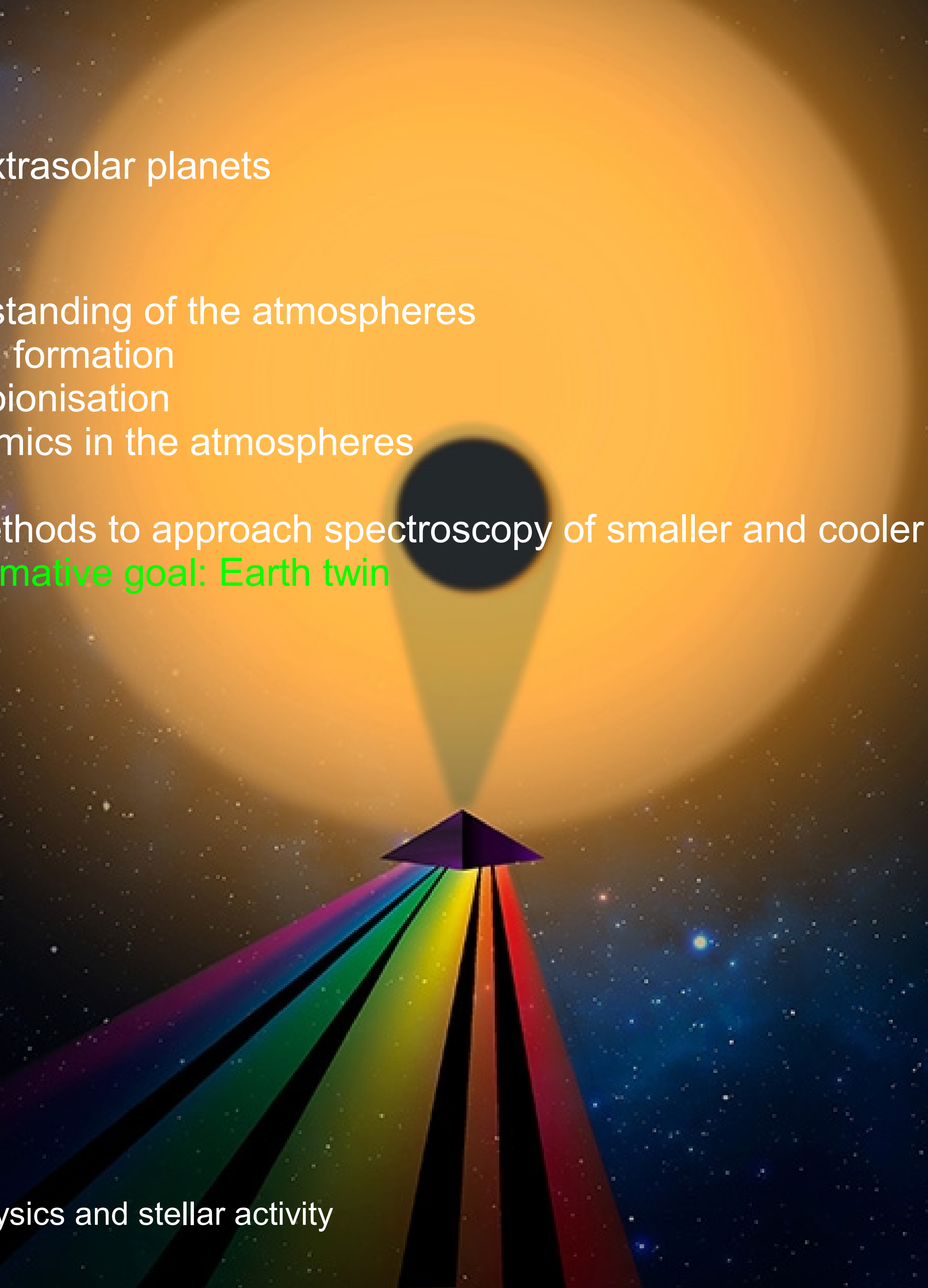
How:

- 3D spectroscopy
- spectral analysis with NLTE models
- stellar evolution models: MS -> LBV -> WR -> SN



Matthias Mallonn

Stellar Physics



What:

Spectroscopy of extrasolar planets

Why:

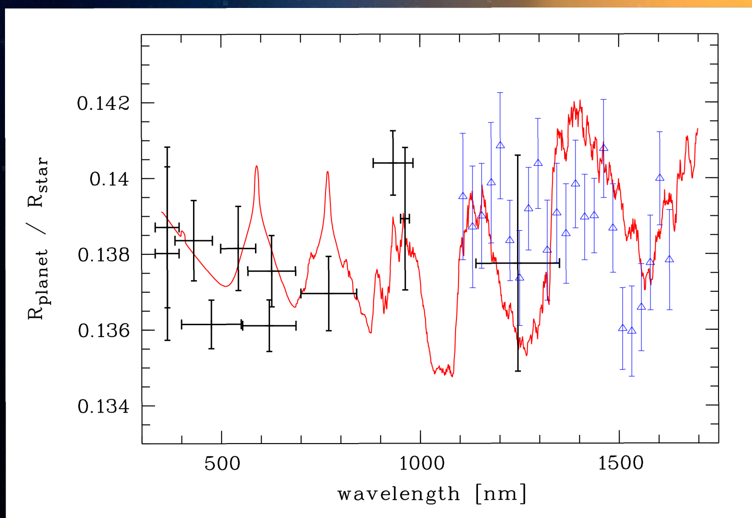
1.) Physical understanding of the atmospheres
e.g. cloud formation
photoionisation
dynamics in the atmospheres

2.) Improve the methods to approach spectroscopy of smaller and cooler planets → ultimative goal: Earth twin

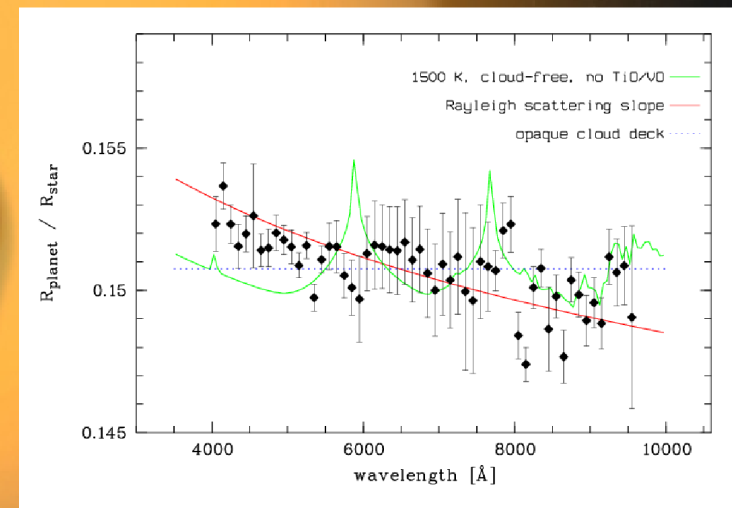
How:

Indirect methods: Transit and secondary eclipse spectroscopy
Spectrophotometry

HAT-P-12b



HAT-P-32b



Matthias Mallonn - stellar physics and stellar activity

Adriana Pires Mancini

Galaxies

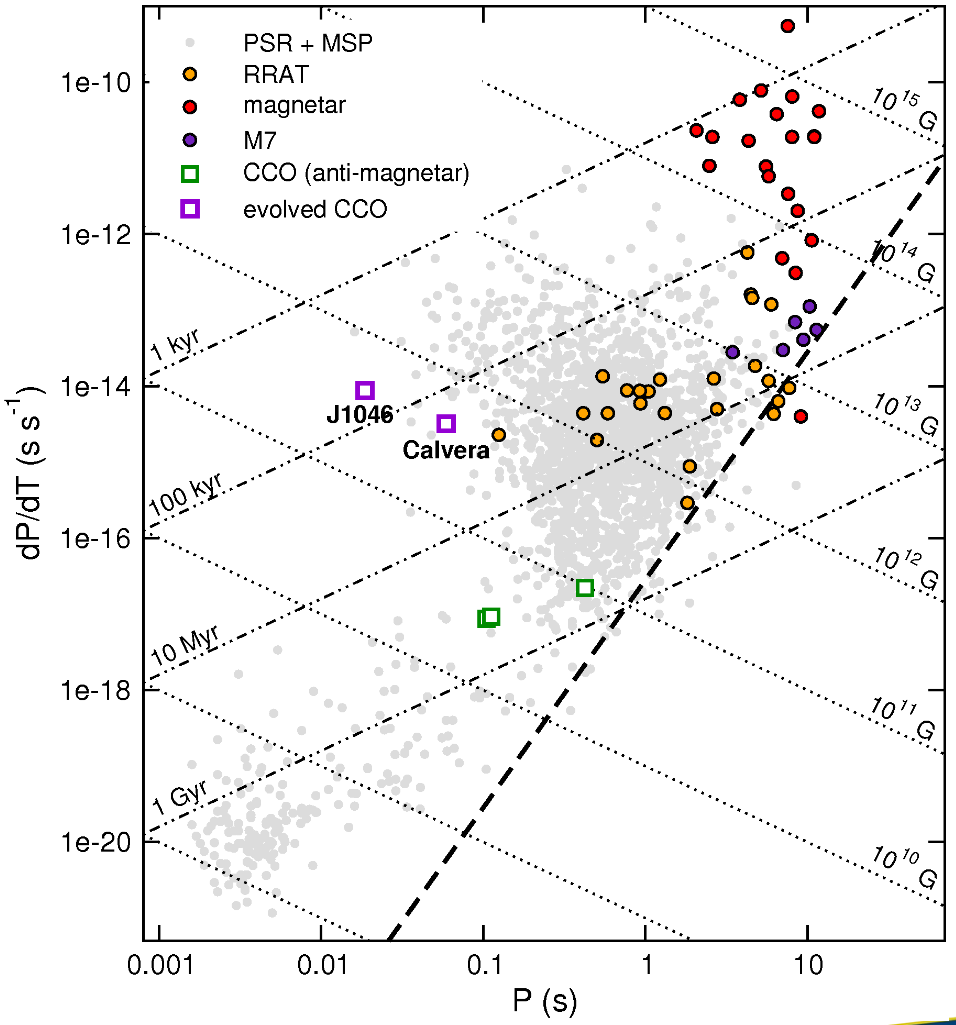
Isolated neutron stars in the Milky Way

„Normal“ (rotation-powered) pulsars do not tell the whole story!

Peculiar groups of isolated neutron stars escape detection in radio pulsar surveys

… also not seen by Fermi

Their properties challenge our understanding of neutron star physics, emissivity, and evolution

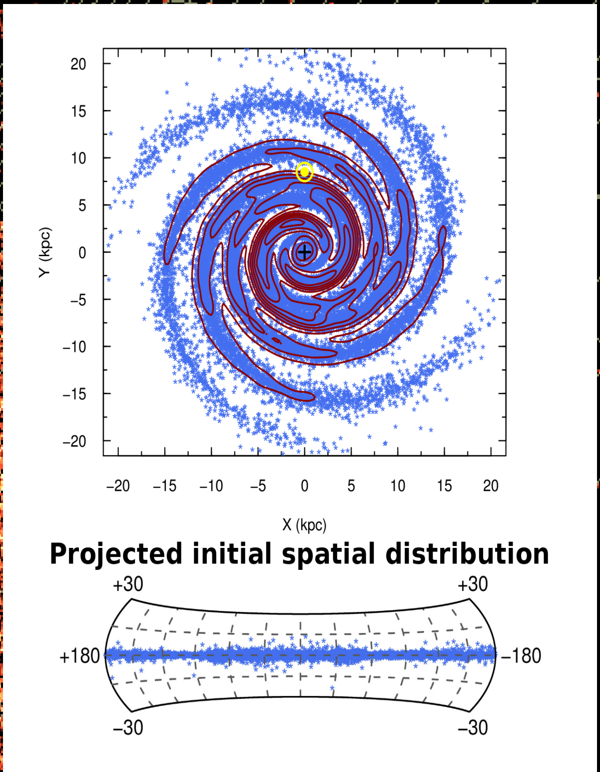


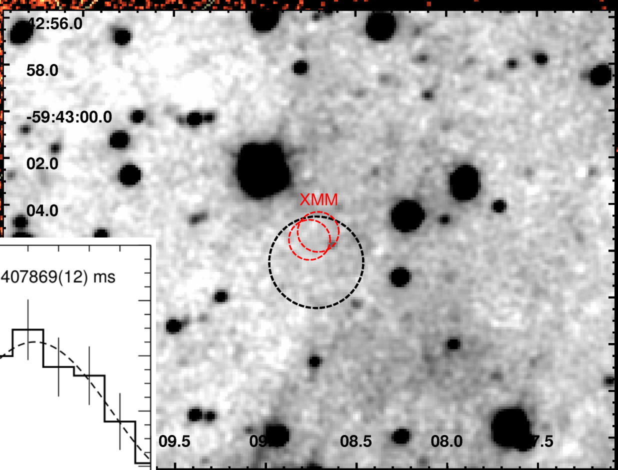
A comprehensive picture of neutron star evolution

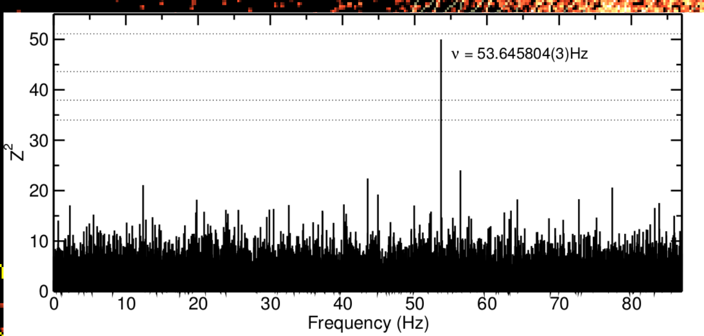
- **Find relations and evolutionary links between the different sub-groups and the normal population**

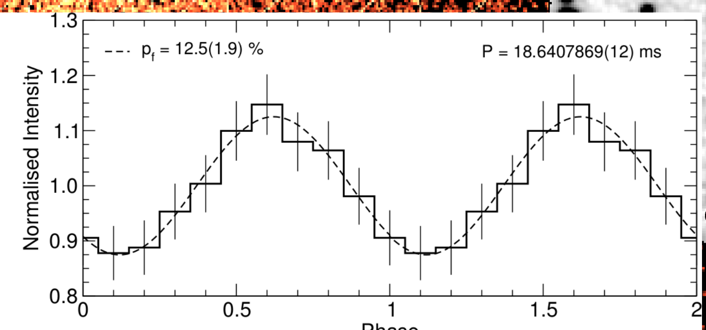
How?

- **Investigation of individual targets (XMM, Chandra, VLT, LBT)**
- **Searches for new candidates and missing links (serendipitous data)**
- **Population synthesis; forecast for eROSITA**







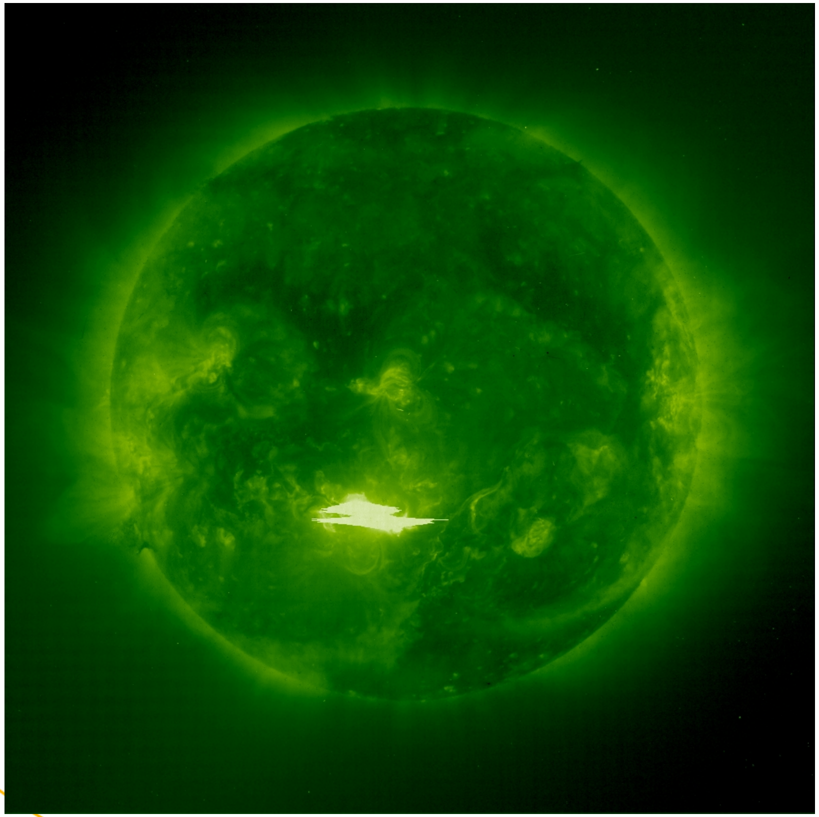


Gottfried Mann

Solar Radio

Electron Acceleration During Solar Flares

Gottfried Mann
Leibniz-Institut für Astrophysik Potsdam (AIP)
An der Sternwarte 16, D-14482 Potsdam, Germany
e-mail: GMann@aip.de



Flares:

– enhanced emission of electromagnetic radiation from the radio up to the γ-ray range
– generation of energetic electrons

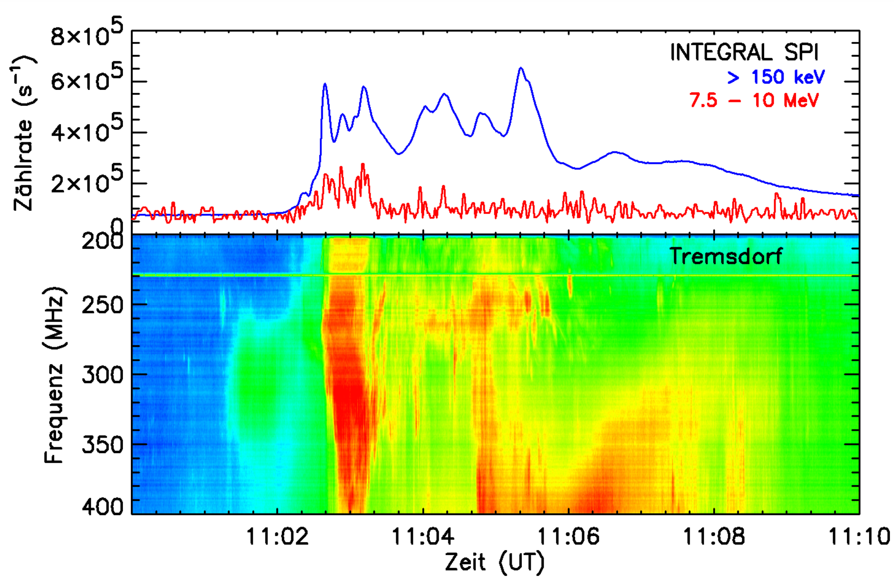
basic problem in astrophysics → e acceleration

Why?

energetic electrons are responsible for nonthermal radio and X-ray radiation

- Sun
- stellar flares
- supernovae remnants
- active galactic nuclei

Electron Acceleration During Solar Flares



strong correlation: radio- and X-ray radiation (acc. up to 10 MeV)

NASA's RHESSI mission

basic question:
How are 1036 electrons accelerated up to energies > 30 keV with in a second during flares?

Only electric fields can accelerated electrons!

varying magnetic fields → electric fields (owing to introduction)

$$\frac{\Delta W}{m_e c^2} \sim \frac{v_A^2}{c^2} \sim \frac{B^2}{N}$$

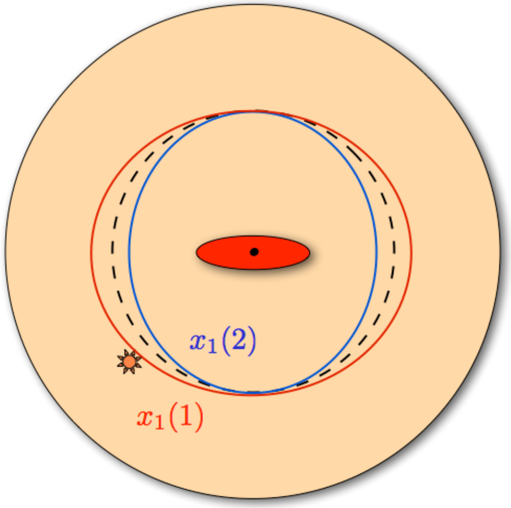
– magnetic field energy per particle

Magnetic fields are necessary for particle acceleration!

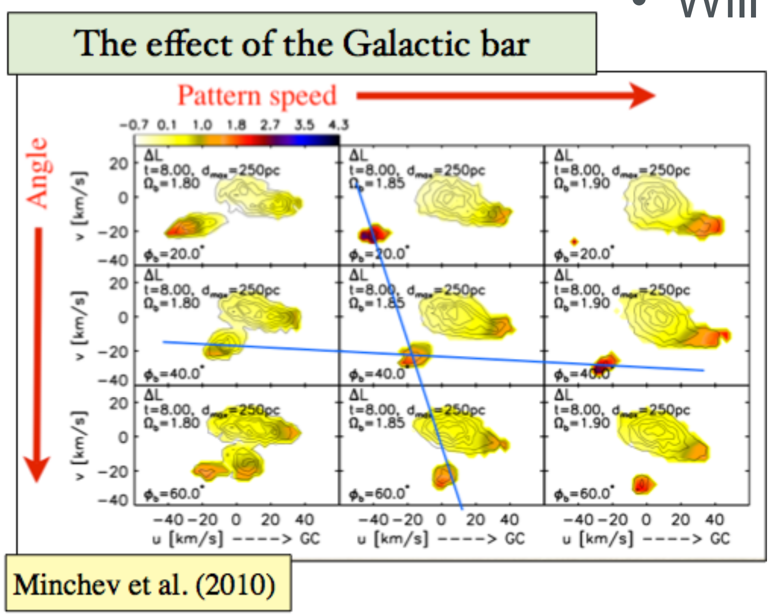
Ivan Minchev

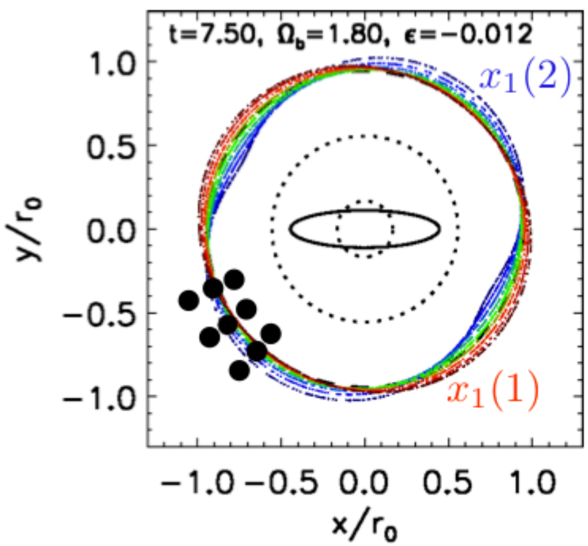
Milky Way and Local Volume

Galactic disk dynamics



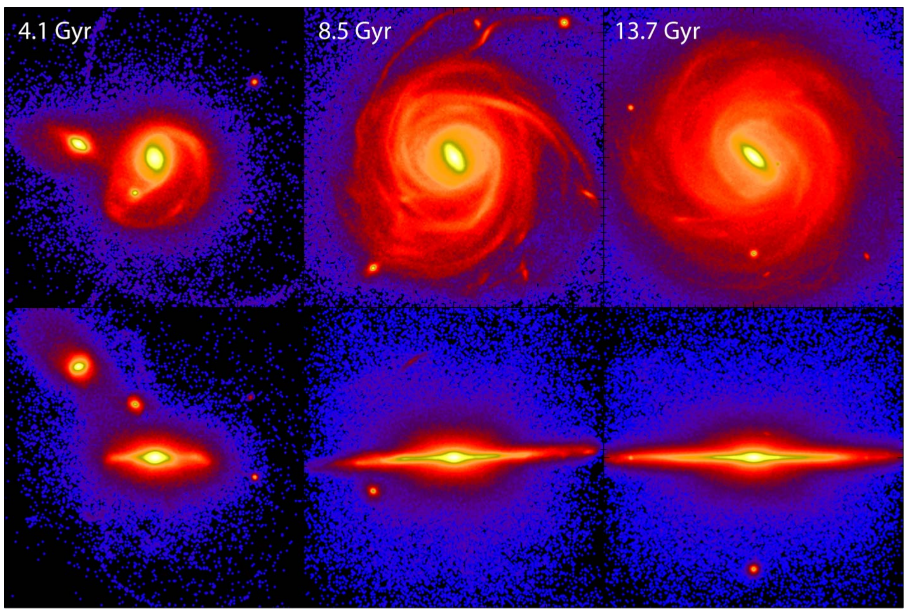
- We still do not know what our Galaxy looks like!
- Resonances with the Galactic bar and spirals create stellar clumps in velocity space.
- Use these to measure the bar and spiral rotation rate, shape, and orientation.
- Will become possible with 4MOST!



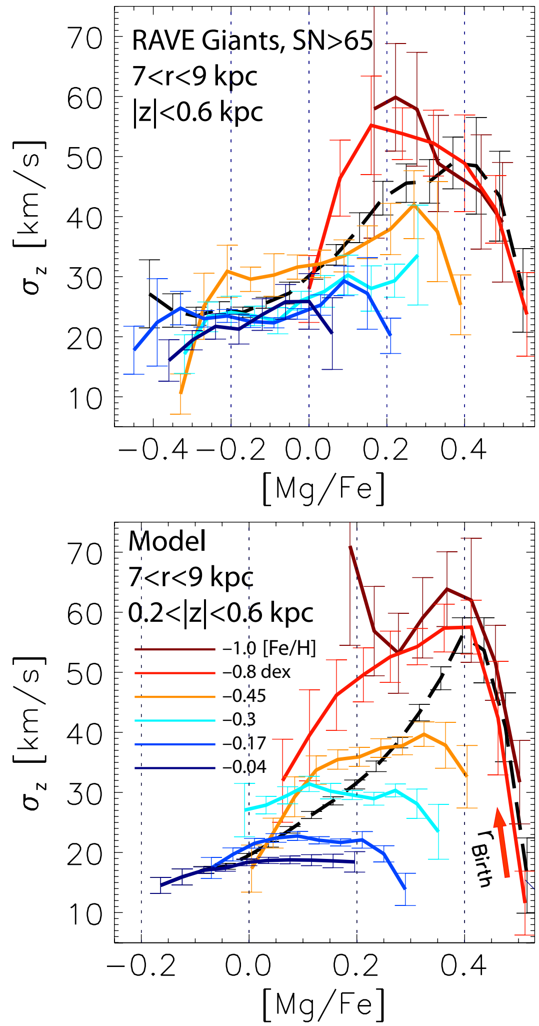


Galactic Archaeology

- Use the stellar chemical and kinematical information at present to reconstruct the past evolutionary history of the Galaxy.
- How did the Galactic disks? Are mergers important? How about the bar and spirals?



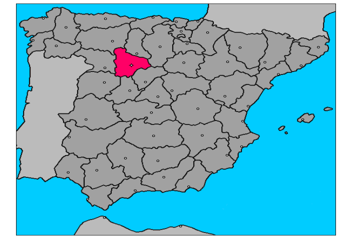
Minchev, Chiappini & Martig (2013, 2014)



Minchev, Chiappini + RAVE (2014)

Benito Moralejo

innoFSPEC

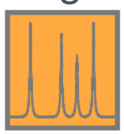


About me:

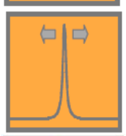
- Electrical Engineering (University of Valladolid, SPAIN)
- PhD – Department of Condensed Matter Physics (University of Valladolid, SPAIN)
    - Design of optical systems to characterize semiconductors, specially solar cells.

Current Research:

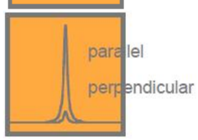
- Multiplex-Raman-Spektroskopie aus der Astrophysik für die Medizin“ (MRS)
- **Raman spectroscopy** involves shining a monochromatic light source (i.e. laser) on a sample and detecting the scattered light.



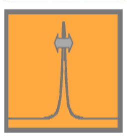
Raman frequencies → composition of material



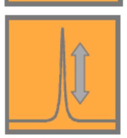
Frequency changes → strain/stress



Polarization of Raman peak → crystal symmetry/orientation



Width of Raman peak → quality of crystal

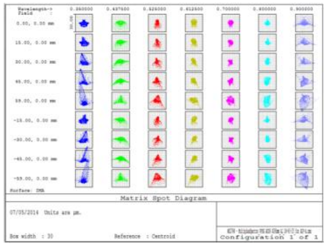


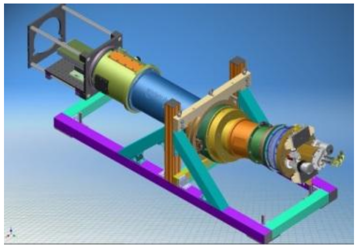
Intensity of Raman peak → amount of material

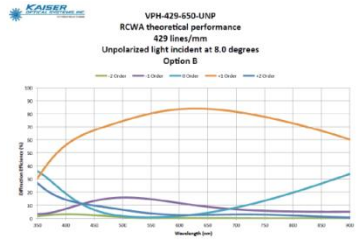
Multichannel Raman Spectroscopy

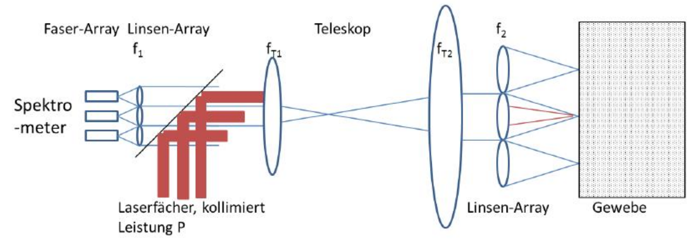
- Design, development and setup of a new fiber-coupled multichannel spectrograph
  - Spectrograph design based on MUSE spectrographs
  - Trade-off between Winlight – AIP – Kaiser Optical Systems Inc (KOSI)
  - Zemax optical simulations
  - Building up the optical setup Raman + Multichannel Spectrograph

Input f-number f/4.33
Wavelength coverage [350 nm – 900 nm]
Detector e2v (model CCD231-84)
At least 80% diffraction energy in 30 µm × 30 µm
Linear dispersion 0.13 nm/pixel
VPHG 429 l/mm, AOI and AOD of 8 degrees
Integration of a shutter + filter holder device
Improved performance at blue wavelengths

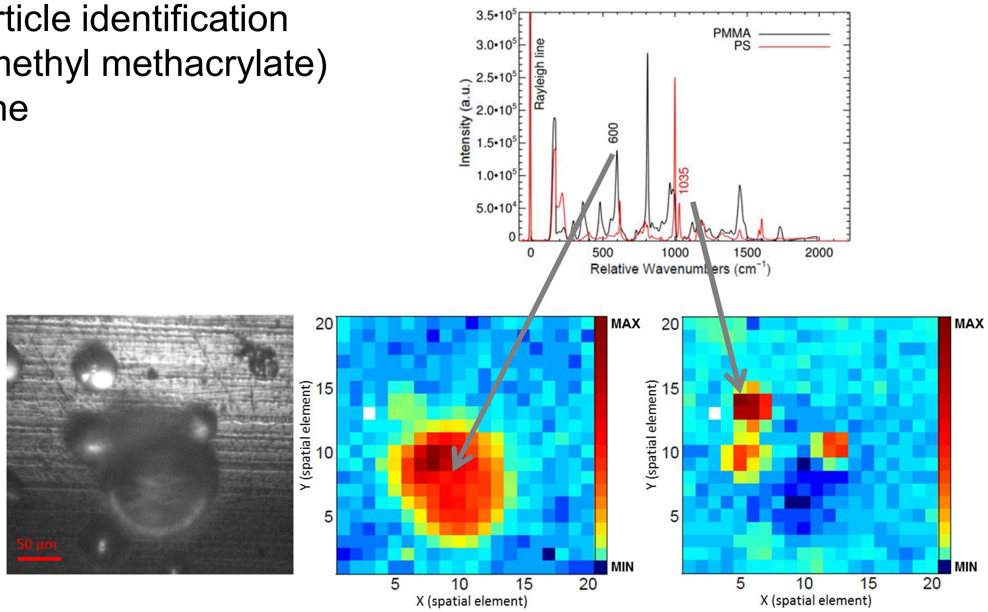








- Raman Imaging: particle identification
  - PMMA: Poly(methyl methacrylate)
  - PS: Polystyrene

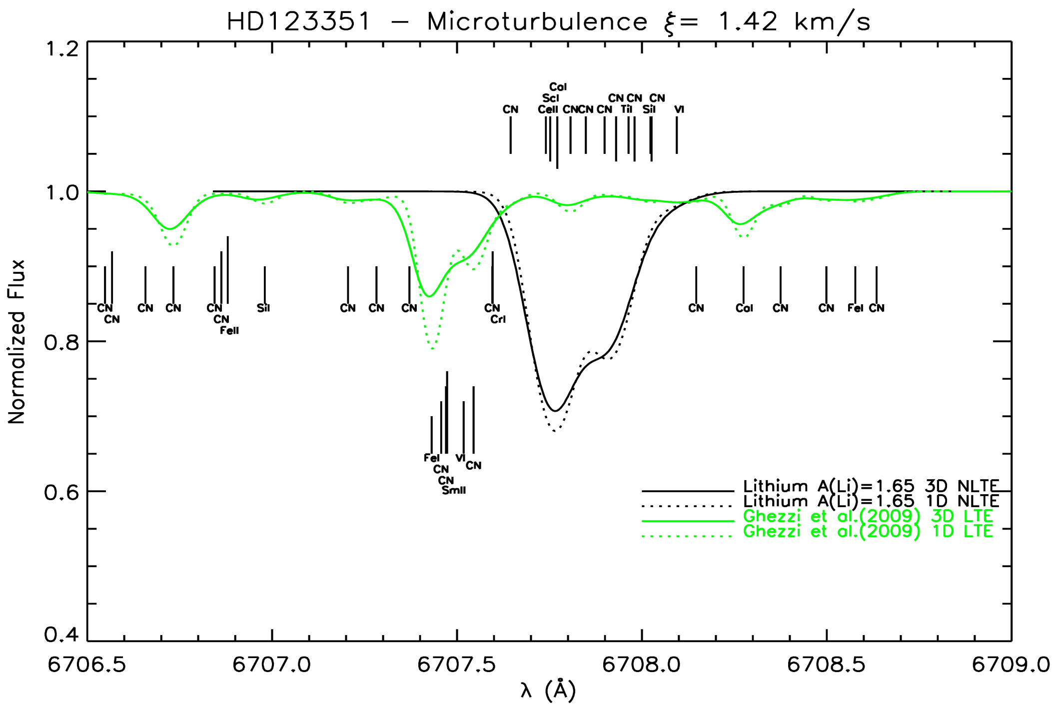


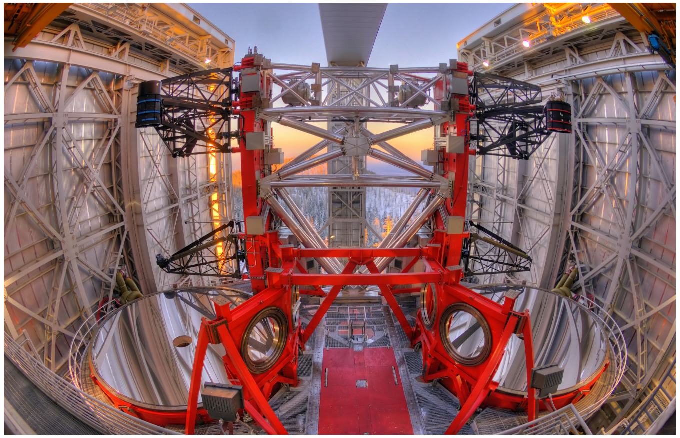
Alessandro Mott

Stellar Physics

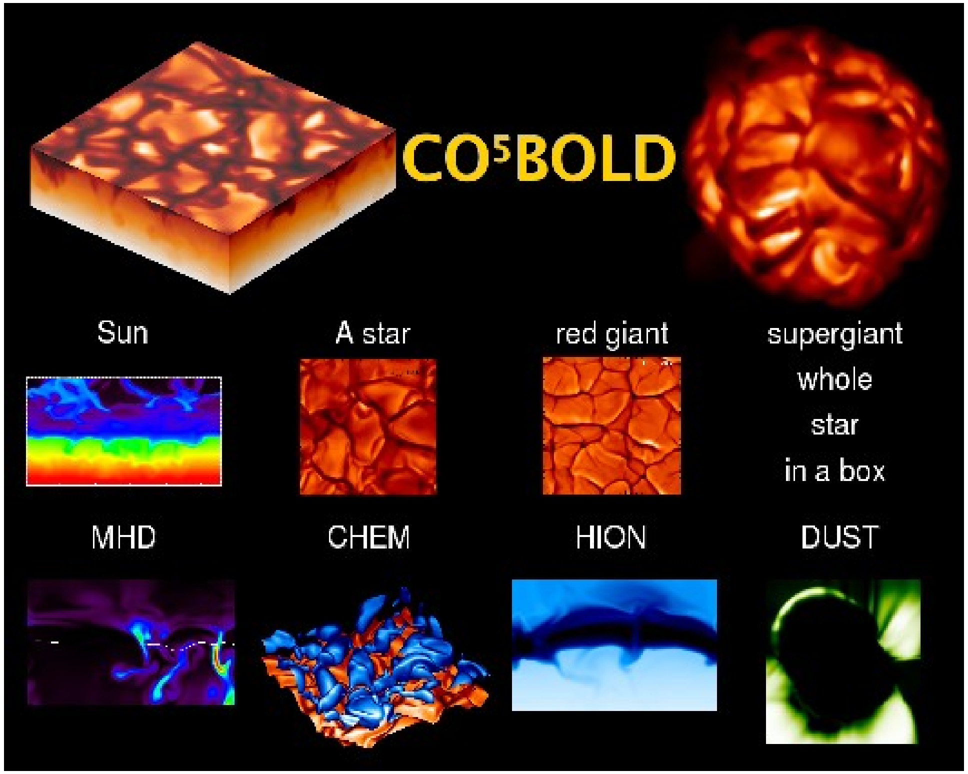
Interpretation of High Resolution Spectra with 3D Model Atmospheres

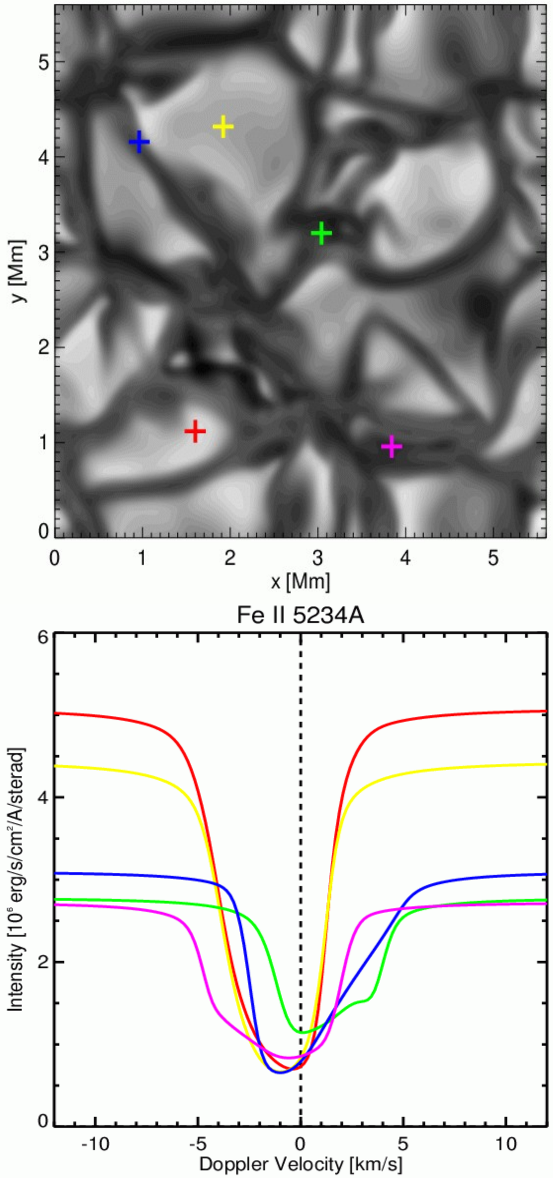
- *PhD student* (01.11.2013 LGS) *Supervisor*: Dr. Steffen, *Co-advisor*: Prof.Dr. Strassmeier
- Analysis of high-res spectra for the determination of ^{6}Li/^{7}Li from the resonance doublet at 670.8 nm
- Atomic and molecular blending lines+NLTE effects
- Waiting for PEPSI at LBT (R≃300.000)





- Testing high quality 3D model atmospheres, that take into account the convection and its effects on the spectral line profile
- Chemical abundance determination by comparison with synthetic spectra.





Jan Peter Mücket

Cosmology

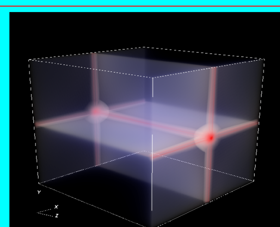
Jan P. Mücket

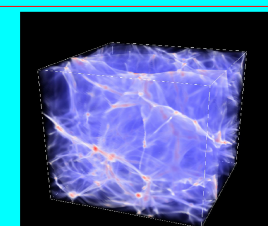
InterGalactic Medium

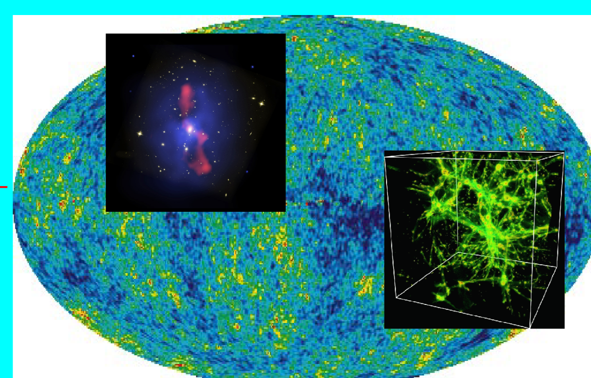
Warm Hot Intergalactic Medium (WHIM)

Structure
filament formation, temperature, density
shock structure, scale dependence, etc.

Distribution
How are the WHIM filaments distributed
in space depending on scale, mass etc.



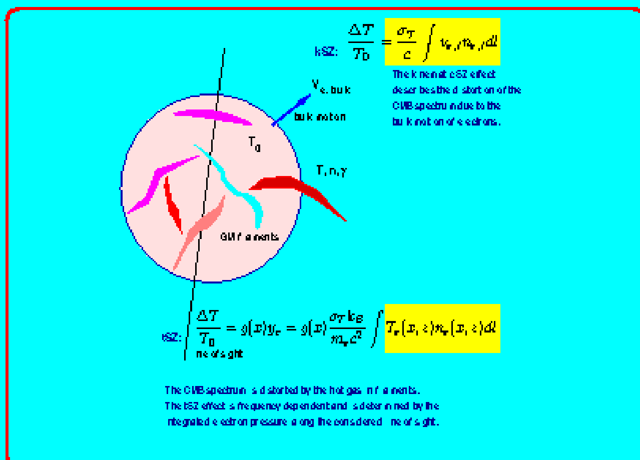


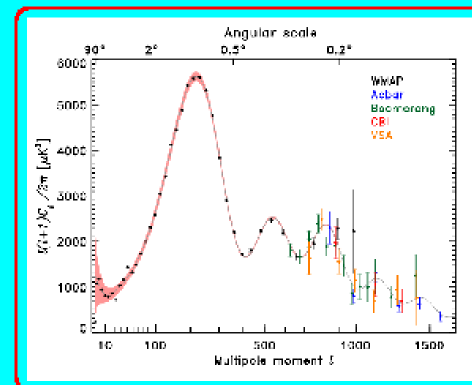


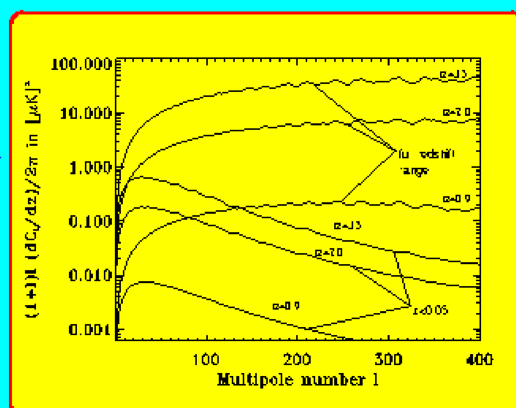
Leibniz-Institut für Astrophysik Potsdam

AIP

The impact of the IGM/WHIM onto CMB via SZ







Contribution to CMB temperature anisotropies

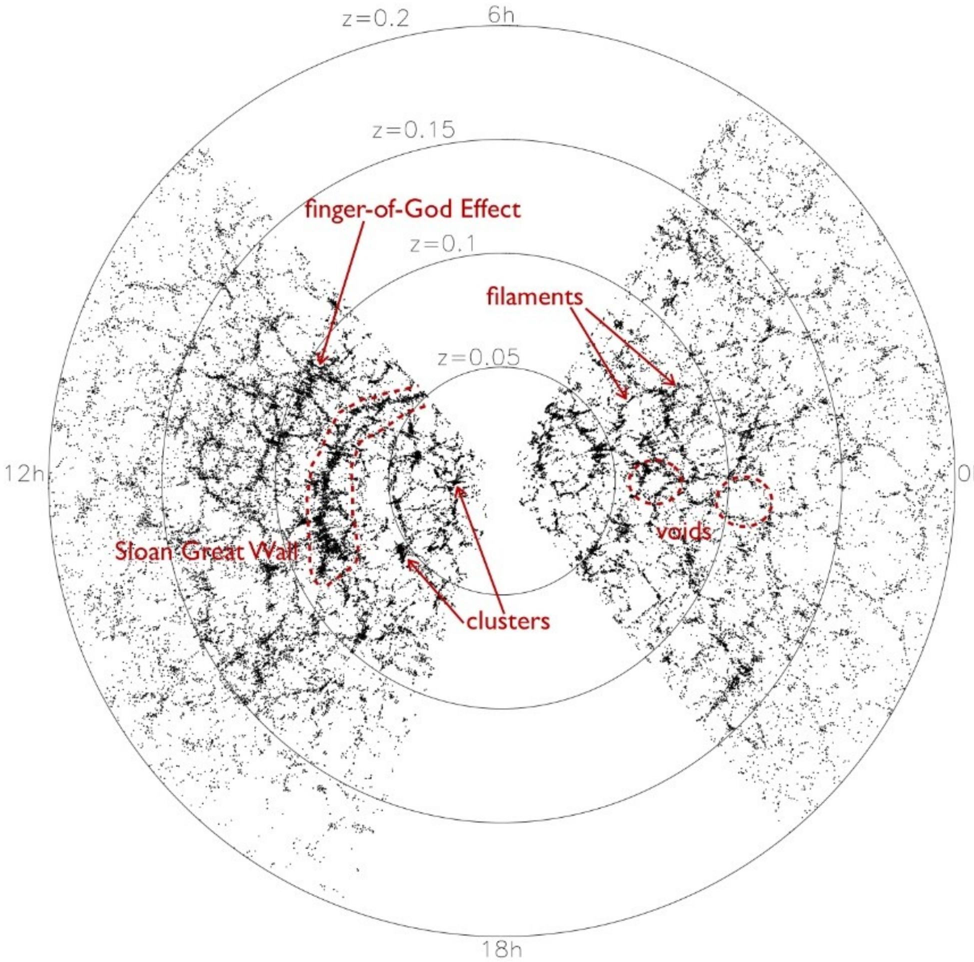
Comparison with PLANCK results

Volker Müller
Cosmology

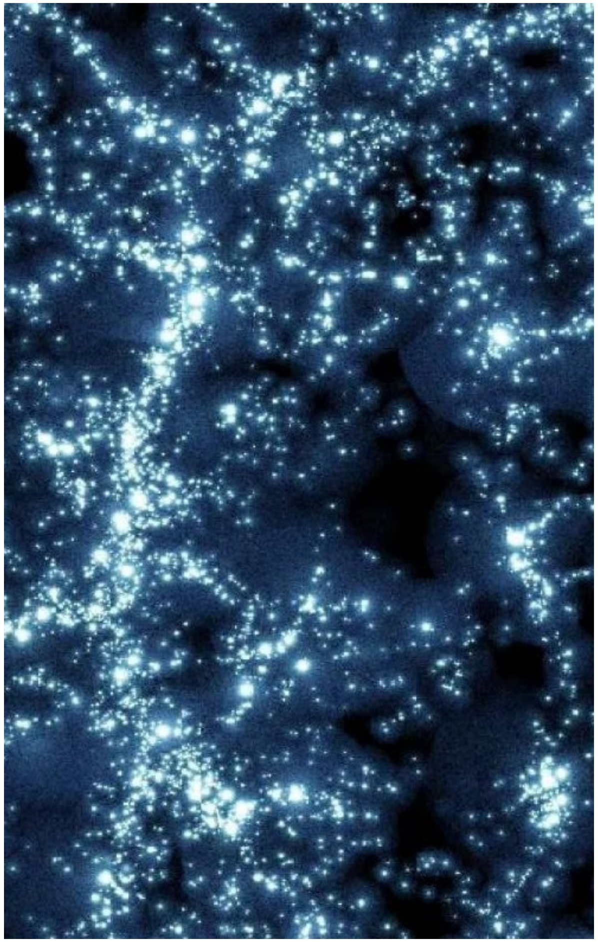
Cosmology and Large-Scale Structure

- Morphology of LSS
- Void finder and void statistics
- Halo mass comparison project
- Galaxy groups in surveys
- Three-point function

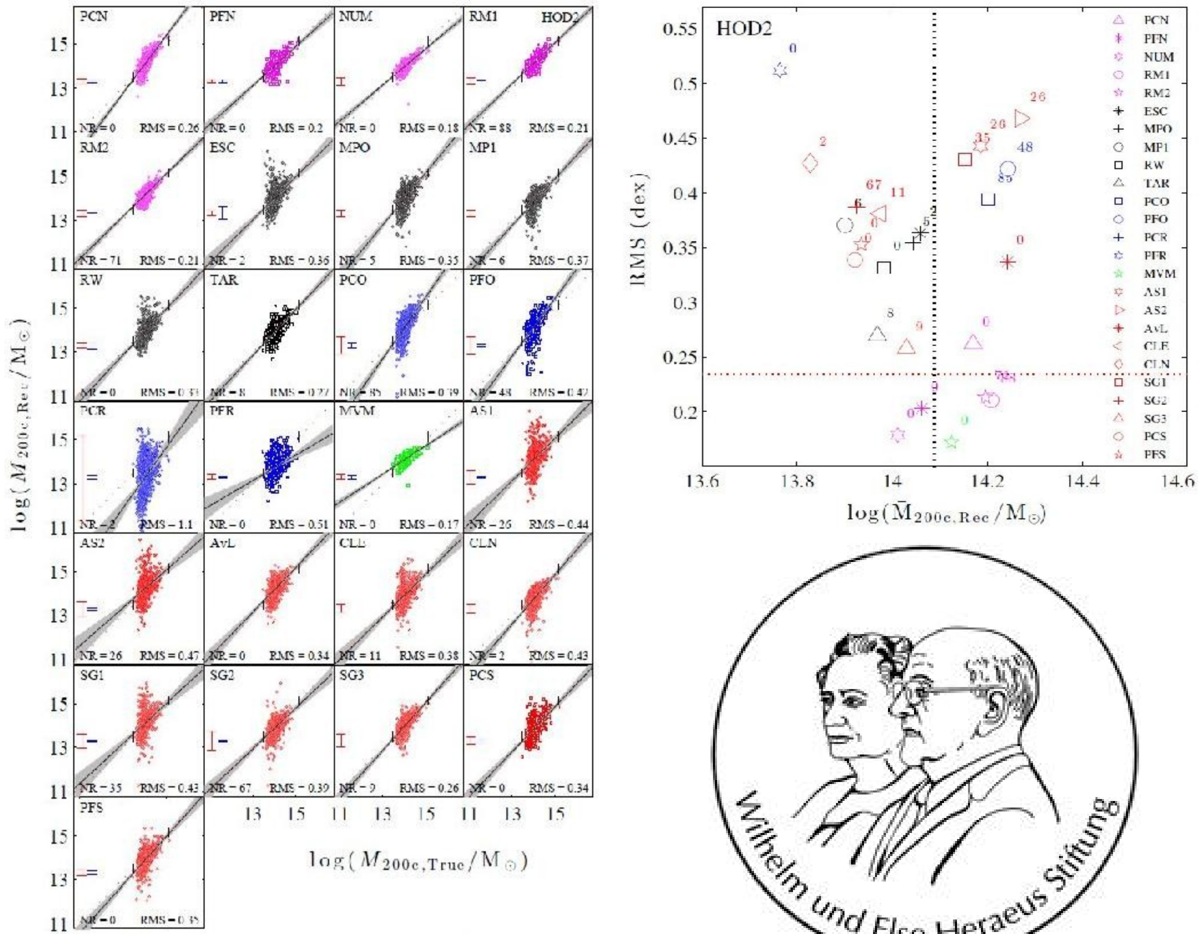
- Lyman-alpha emitters
- IGM: Lyα and metal absorber
- Proximity effect
- Cosmic reionisation



Cosmology and Large-Scale Structure



Sloan great wall



Halo mass recovery

2015:100 years ART

Sebastian Nuza

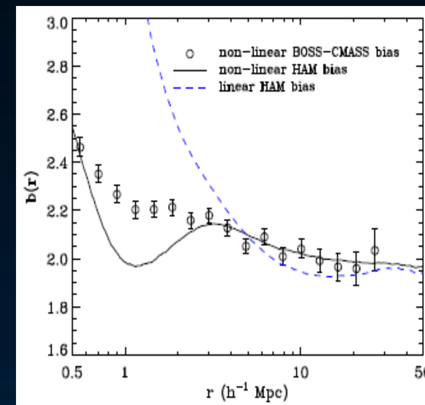
Cosmology

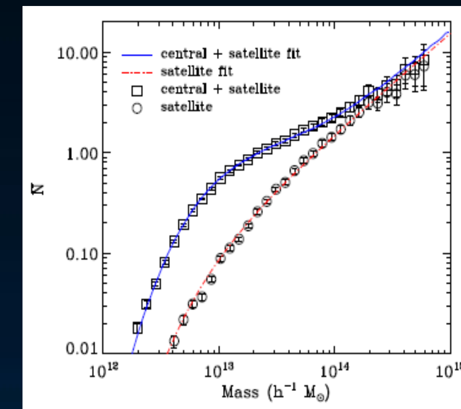
Large-Scale Structure and Galaxy Formation

Sebastián Nuza (snuza@aip.de)

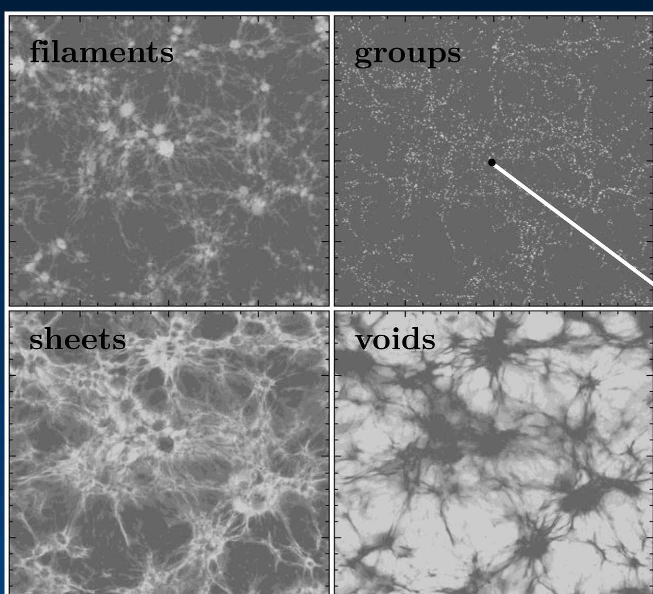
Galaxy Surveys (SDSS, 2MASS, BOSS)

- Clustering of galaxies (including BAOs)
- Characterization of galaxy populations (Luminosity, Colour, Bias, HOD, etc.)
- Environmental dependence of galaxy properties

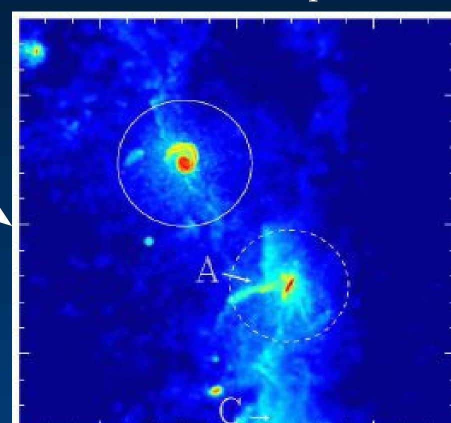




Local Cosmic Web



Local Group



(H I projection)

(e.g., Nuza et al. 2010; Müller, Hoffmann & Nuza 2011; Kitaura, Erdoğdu, Nuza et al. 2012; Nuza et al. 2013; Nuza et al. 2014a,b)

Cosmological Simulations

- The Local Universe (CLUES+)
- How to define the Cosmic Web?
- The Local Group as a proxy for galaxy formation:
  - Formation history
  - Galaxy properties at $z = 0$
  - Gas accretion and SFR
  - Neutral gas in MW and M31 (distribution, accretion, column densities, etc.)
  - Comparison with observations

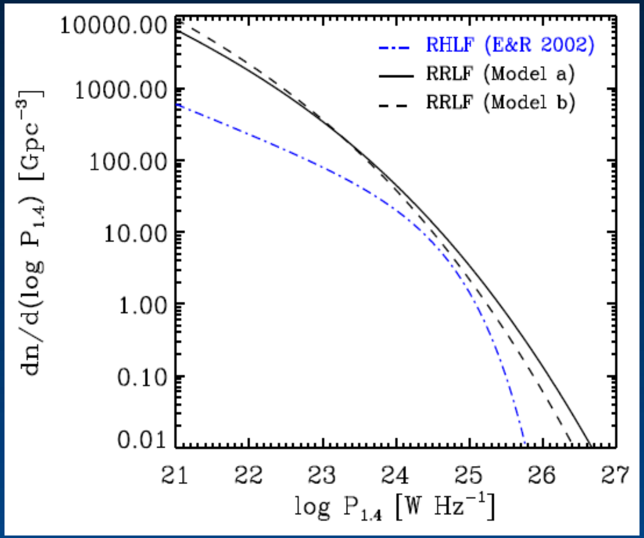
Diffuse Radio Emission from Galaxy Clusters

Sebastián Nuza (snuza@aip.de)

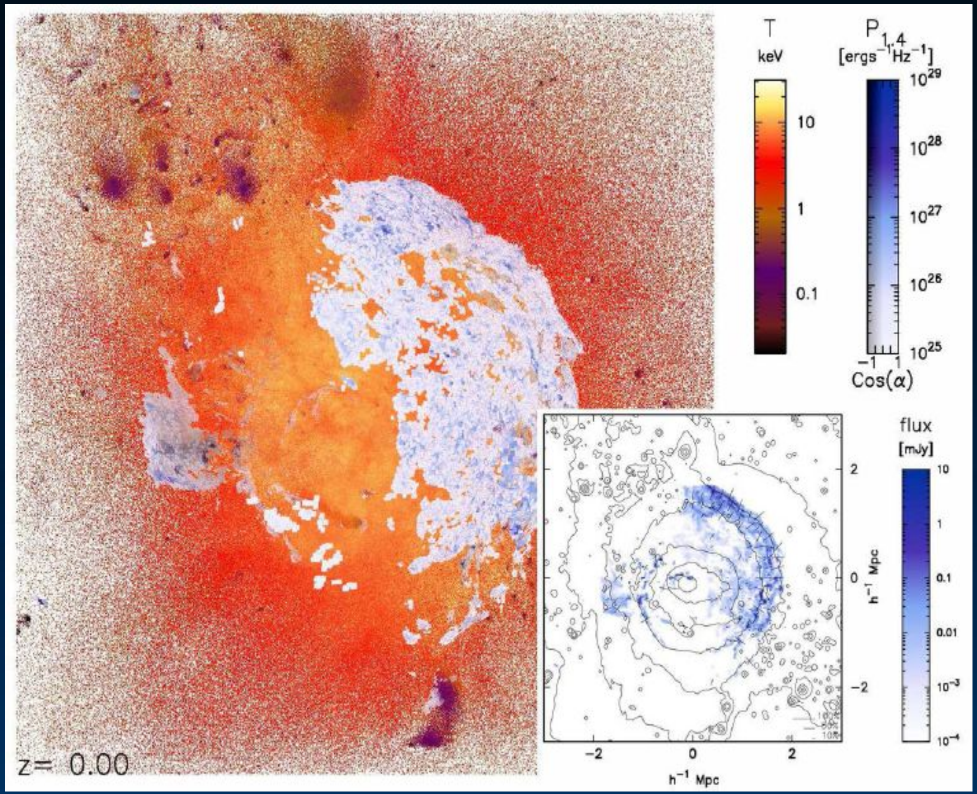
Radio Relics

- Relics as tracers of cosmological shock waves
- Morphological properties
- Statistics as a function of redshift
- Non-thermal radio emission models
- Ongoing search of new Relics (GMRT+)

Simulated Radio Relic Luminosity Function at $z = 0$



(e.g., van Weeren et al. 2011; Hoeft, Nuza et al. 2011; Nuza et al. 2012)



Cosmological Simulations

- Modelling of Relics in hydrodynamical simulations
- Mach number distribution
- Synthetic catalogues
- Statistical predictions

Hakan Önel

Solar Radio

Hakan Önel

Who am I?

- 1999-2004 student (Physics)
- 2005-2008 PhD student
- Since 2009 PostDoc

Membership @ AIP Boards

- Works Council
- Internal Scientific Committee

Where am I?

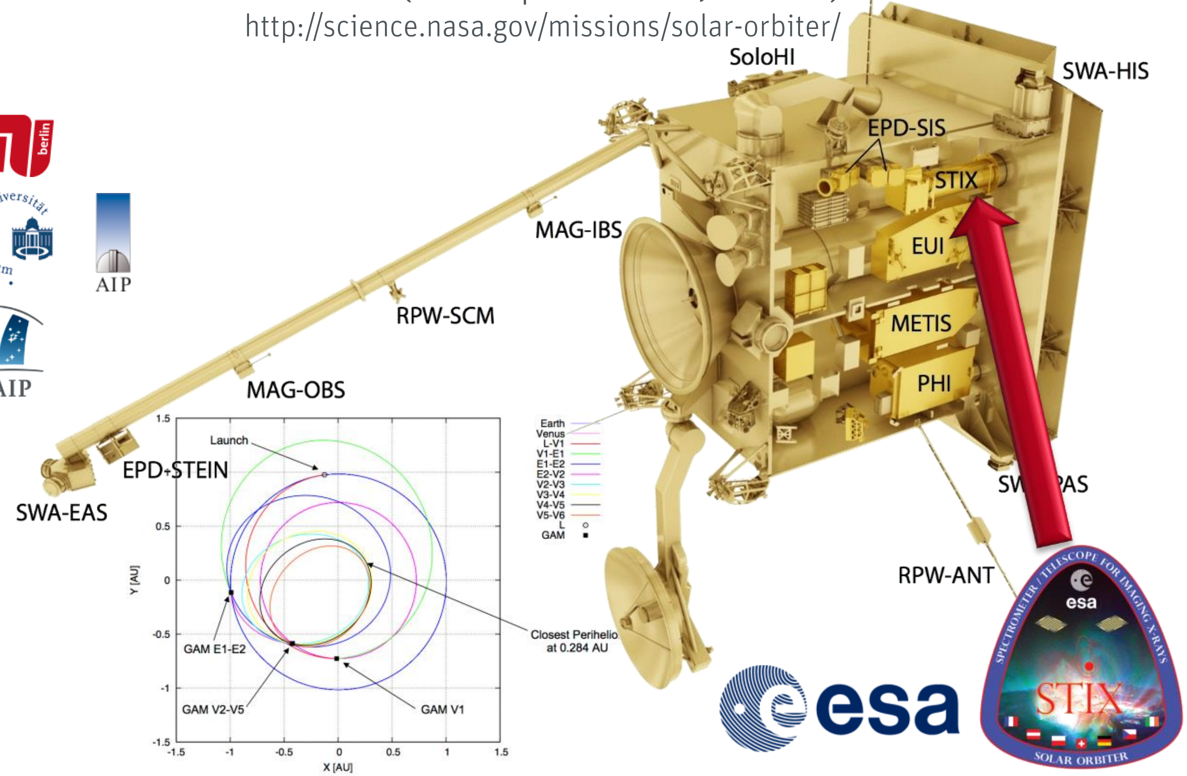
- Physics of the Sun
  @Solar Radio Group (Mann)

What do I do?

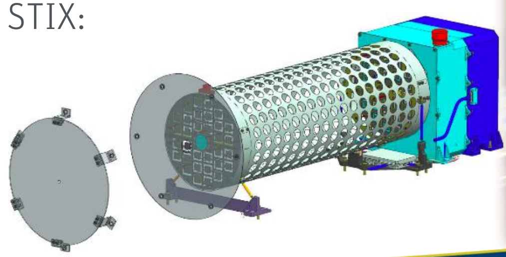
Field of expertise in “flare physics”, i.e,

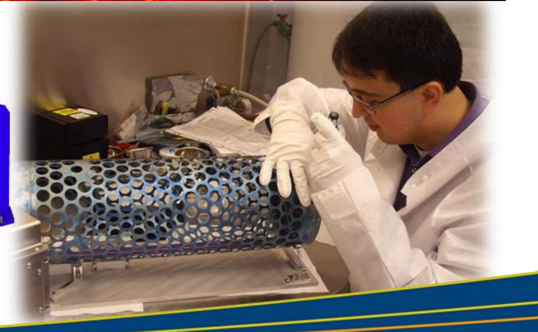
- electron acceleration process,
- electron transportation
- Project scientist and manager
  (Instrumentation & Space Technology)

Solar Orbiter
(launch planned for Jul.2017)
http://science.nasa.gov/missions/solar-orbiter/



Structural Thermal Model (STM) of STIX:





Hakan Önel

Solar Orbiter Mission Objective

How does the Sun create and control the heliosphere?

- How and where do the solar wind plasma and magnetic field originate in the corona?
- How do solar transients drive heliospheric variability?
- How do solar eruptions produce energetic particle radiation that fills the heliosphere?
- How does the solar dynamo work and drive connections between the Sun and the heliosphere?