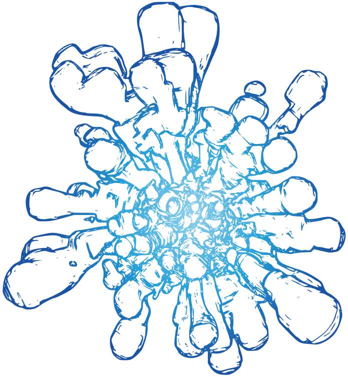
X-Ray and Gamma-Ray Emission from CCSNe

Comparison of 3D Neutrino-driven Explosions With SN 1987A

S3.1



Roughly first few hundred days

Photons from ^{56}Ni → ^{56}Co → ^{56}Fe

Early hard X-ray emission constrains progenitor models

Chandrasekhar Mass Deflagrations as a Model for Type Iax Supernovae

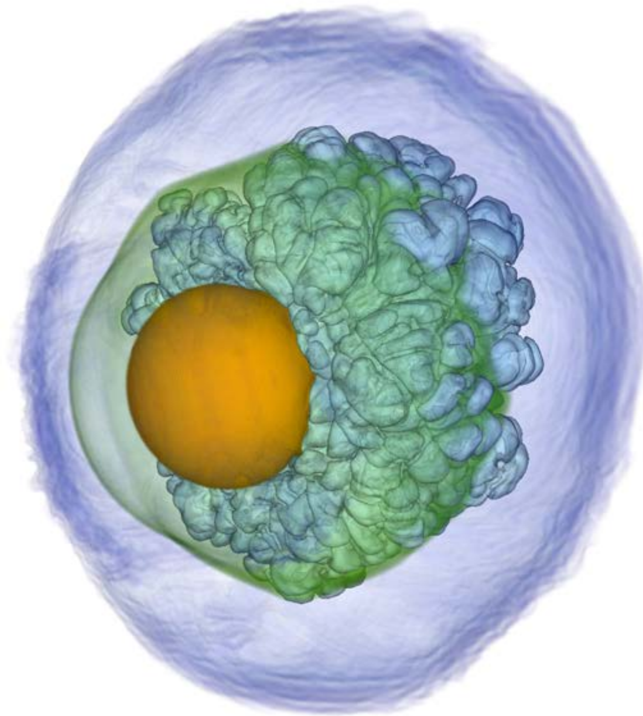
Florian Lach
Zentrum für Astronomie (ZAH), Heidelberg Institute for Theoretical Studies (HITS), Heidelberg

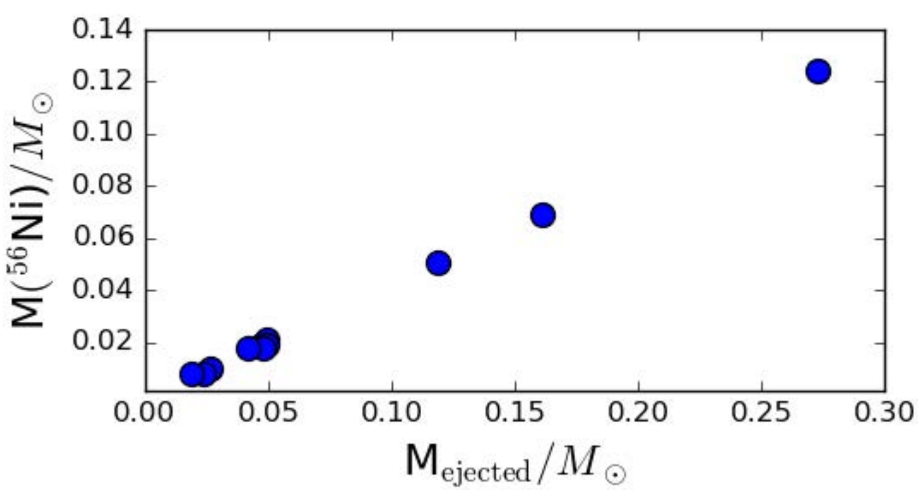
S3.3

Single spot ignition in C/O WD

- Central density
- Off-set radius
- Metallicity

Interplay between parameters





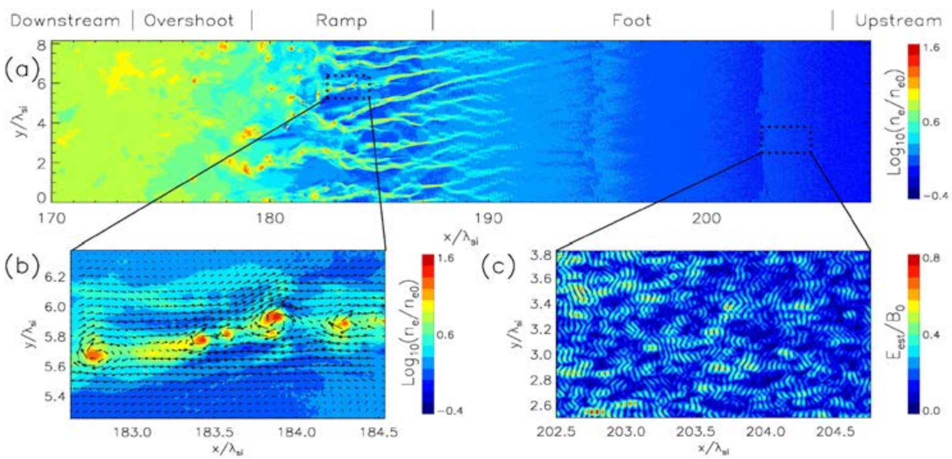
- Faint events ⟶ down to SN2008ha
- Metallicity dependent nucleosynthesis yields
- Bound remnants
  - ➔ Large range in kick velocities

Physics of nonrelativistic perpendicular shocks of young supernova remnants S4.4

Artem Bohdan, DESY.

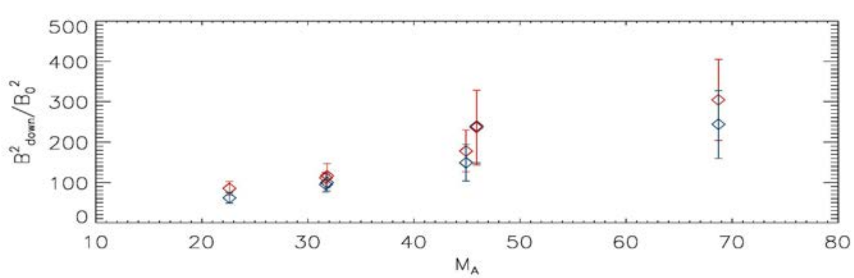
Shock structure

The structure is defined by shock reflected ions, Buneman and Weibel instabilities are excited.



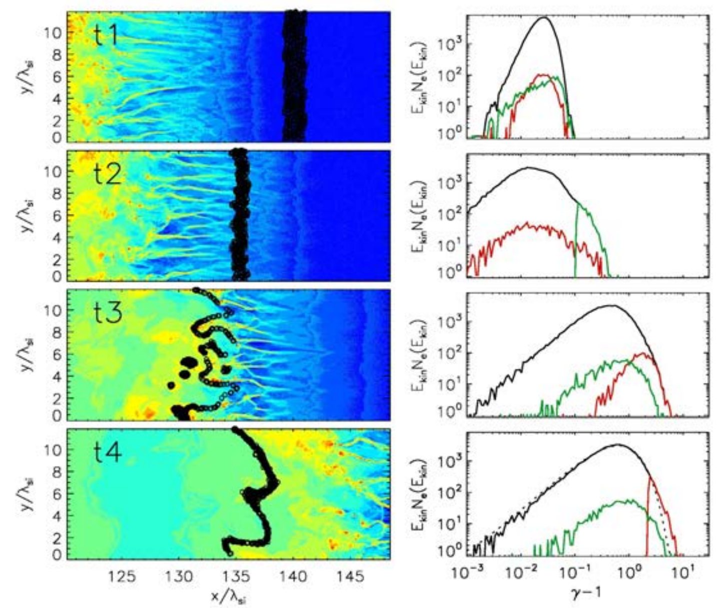
Magnetic field in the downstream

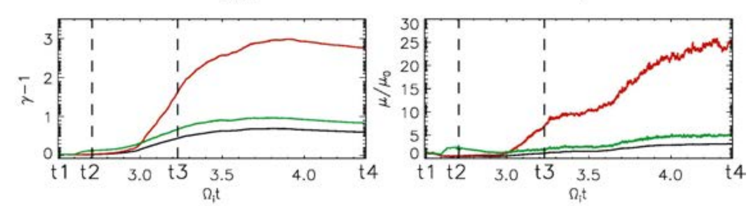
Magnetic field is strongly amplified, up to 27 times.
Predicted by RH cond. ~ 4



Production of nonthermal electrons

Mainly produced via <u>magnetic reconnection</u> and <u>second-order Fermi acceleration</u> process, not Buneman instability





Synchrotron radiation in Cas A:

S4.6

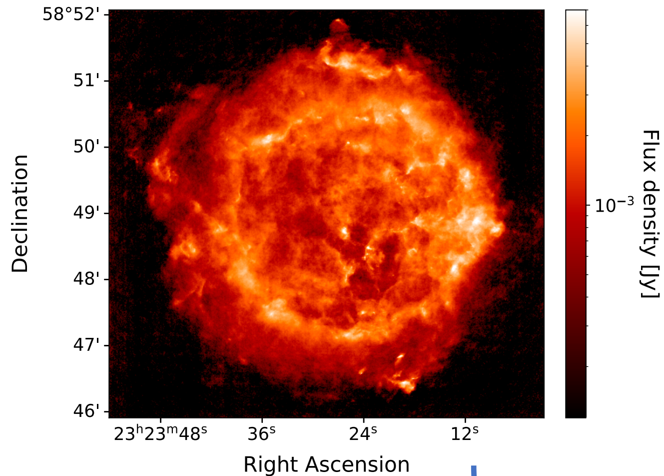
the non-linear connection

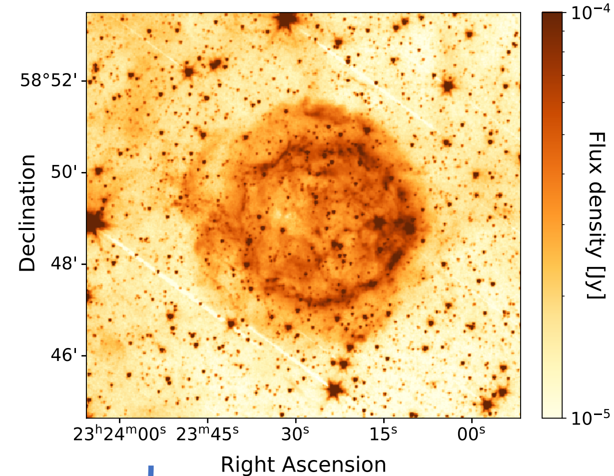
Vladimír Domček, Jacco Vink, Maria Arias & Ping Zhou

ANTON PANNEKOEK INSTITUTE

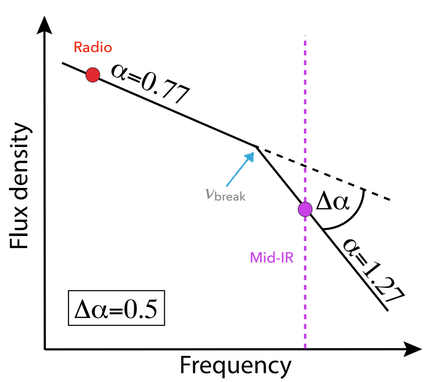
GRAPPA GRavitation AstroParticle Physics Amsterdam

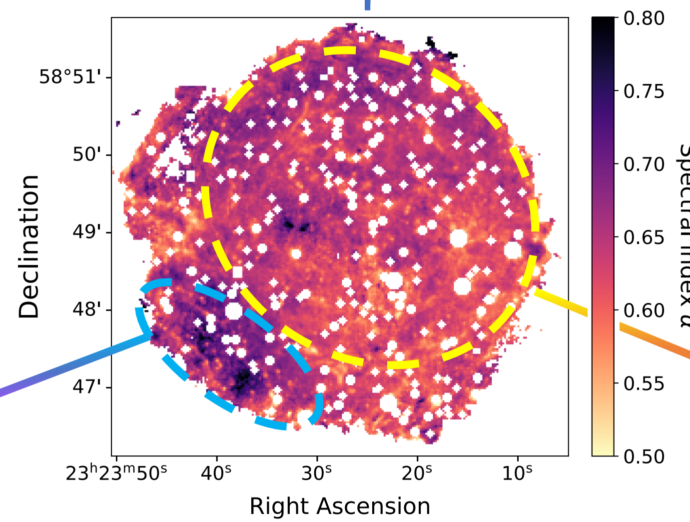
VLA

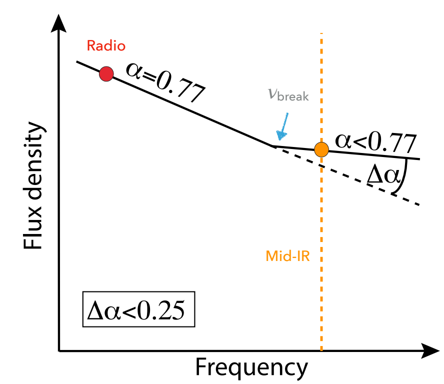




Spitzer







Spectral steepening

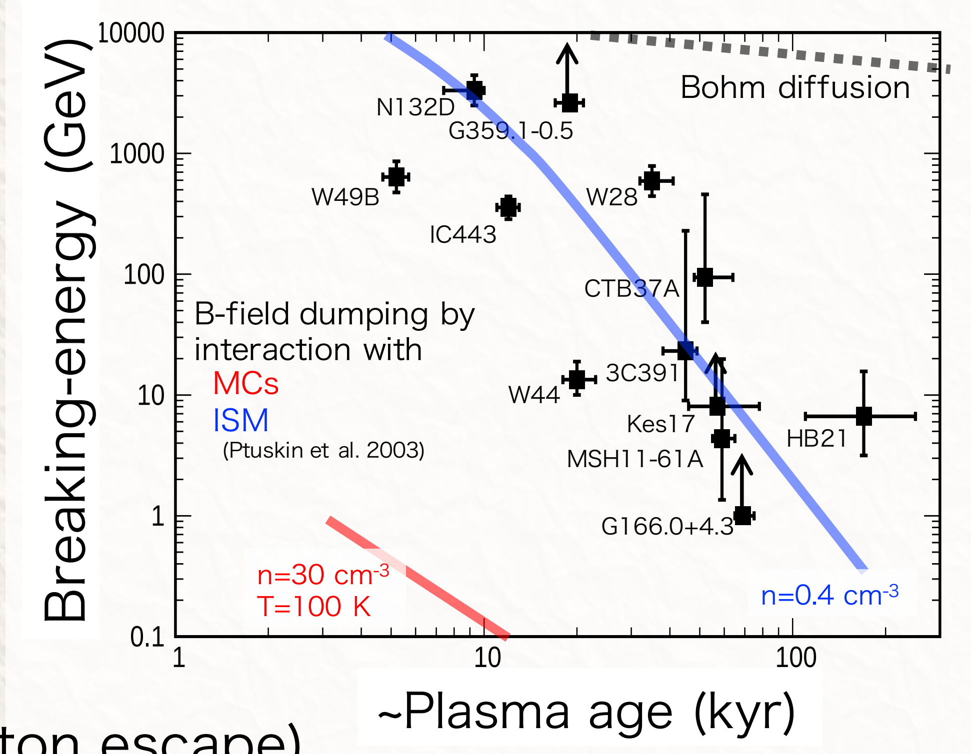
Spectral flattening

A systematic study on **escaping of cosmic rays** from SNR shocks through observations of **thermal X-ray plasmas**

No. S4.16

Hiromasa Suzuki[1],
Aya Bamba[1], Hirokazu Odaka[1], Ryo Yamazaki[2], Hiroya Yamaguchi[3], Yutaka Ohira[1]
1: The University of Tokyo; 2: Aoyama Gakuin Univeristy, 3: ISAS/JAXA

- **Cosmic-ray escape from SNR shocks**
  - Detections of soft GeV emission from old SNRs = Direct evidence for proton acceleration. (e.g. Abdo et al. 2010)
  - What timescale do protons escape and become cosmic rays ?



- Combining **GeV analysis** (-> proton escape) and **X-ray analysis on thermal plasma** (-> time evolution of SNR), we could estimate the **escape timescale**, and it was consistent with theoretical prediction.

QUASI-PARALLEL COLLISIONLESS SHOCK (RE)FORMATION AND PARTICLE ACCELERATION BY (NON)RESONANT MICRO-INSTABILITIES

S4.19

VLADIMIR ZEKOVIĆ & BOJAN ARBUTINA | Department of Astronomy, Faculty of Mathematics, University of Belgrade, Serbia

LINEAR THEORY

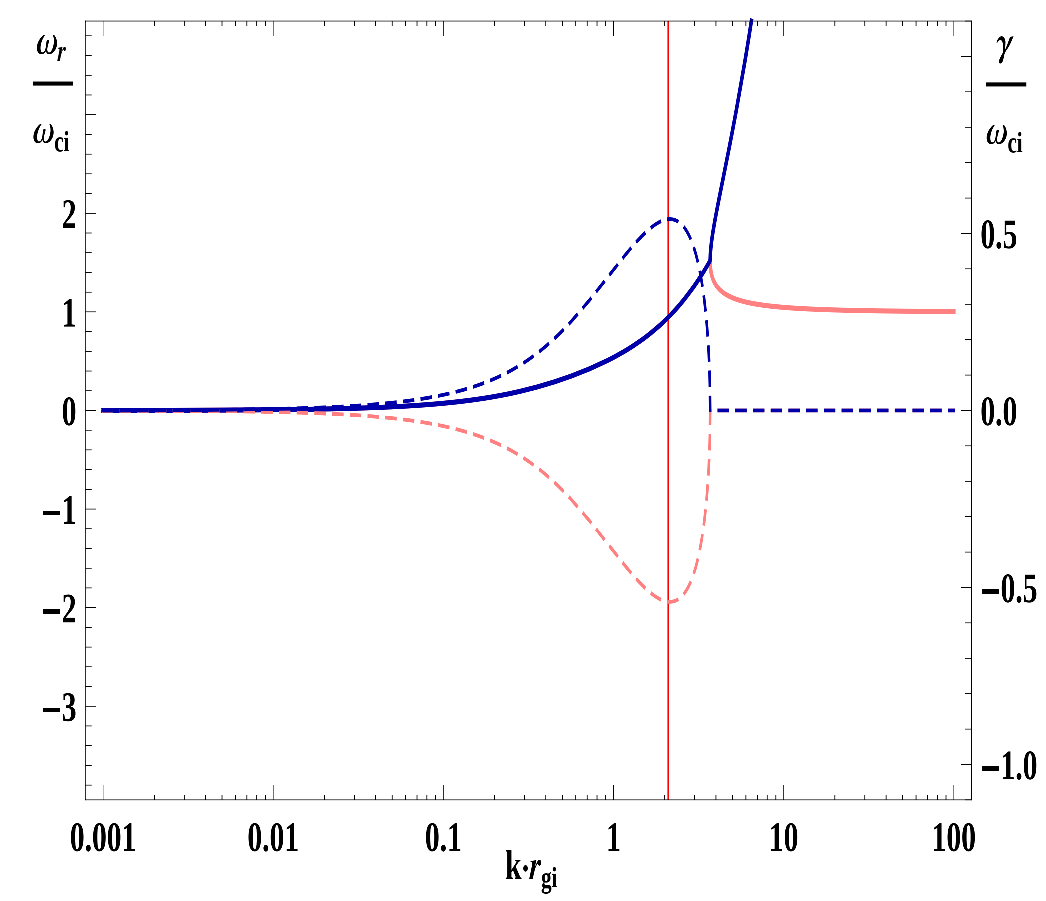
Two cold, magnetized, counter-streaming plasmas excite the RESONANT micro-instabilities.

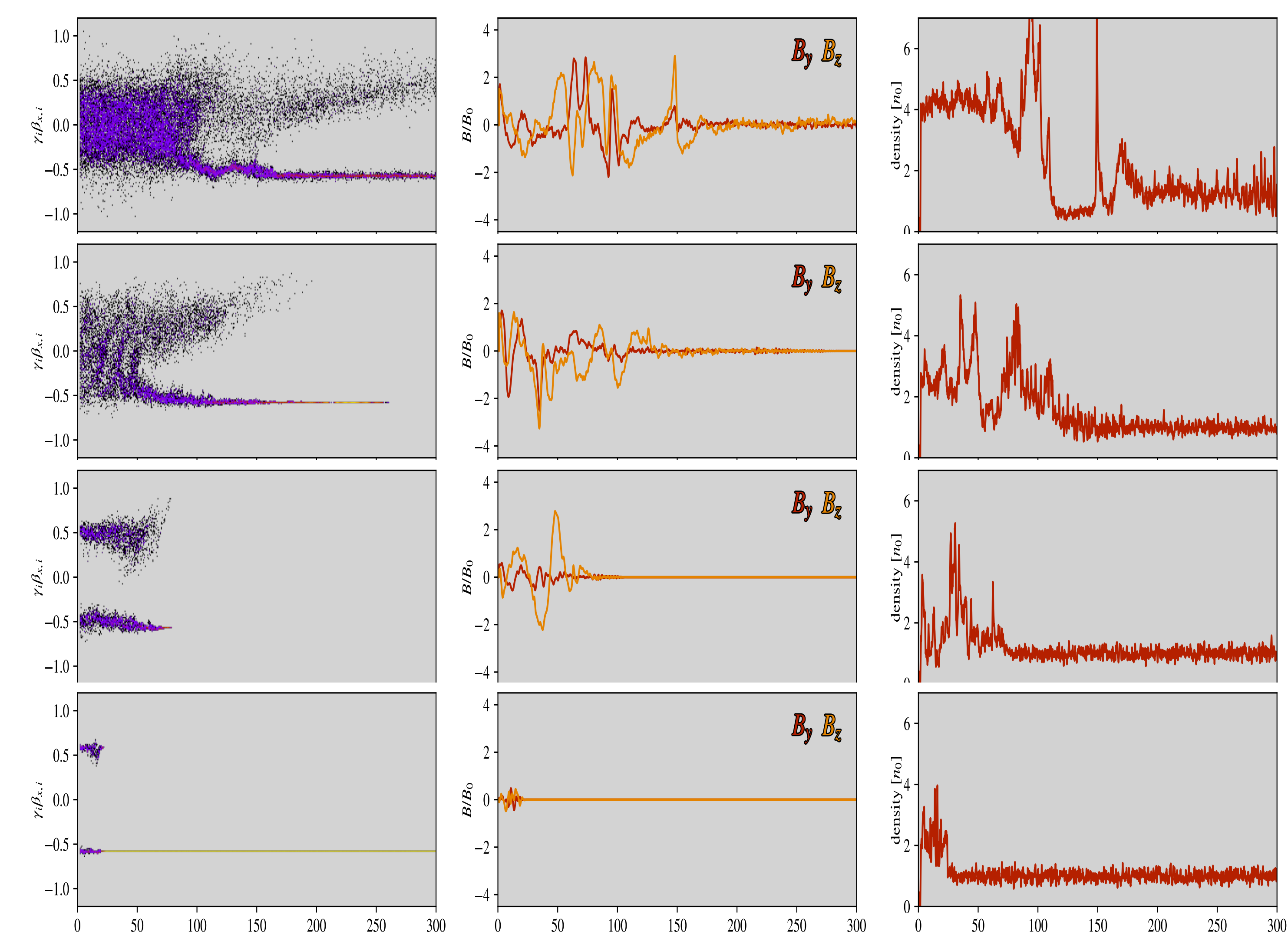
KINETIC SIMULATIONS

These modes TRIGGER the shock FORMATION.

The typical compression ratio of ~4 –> consequence of a highly resonant micro-physical process.

The (NON-)RESONANT modes REFORM the shock by the MAGNETIC REFLECTIONs of the upstream flow.



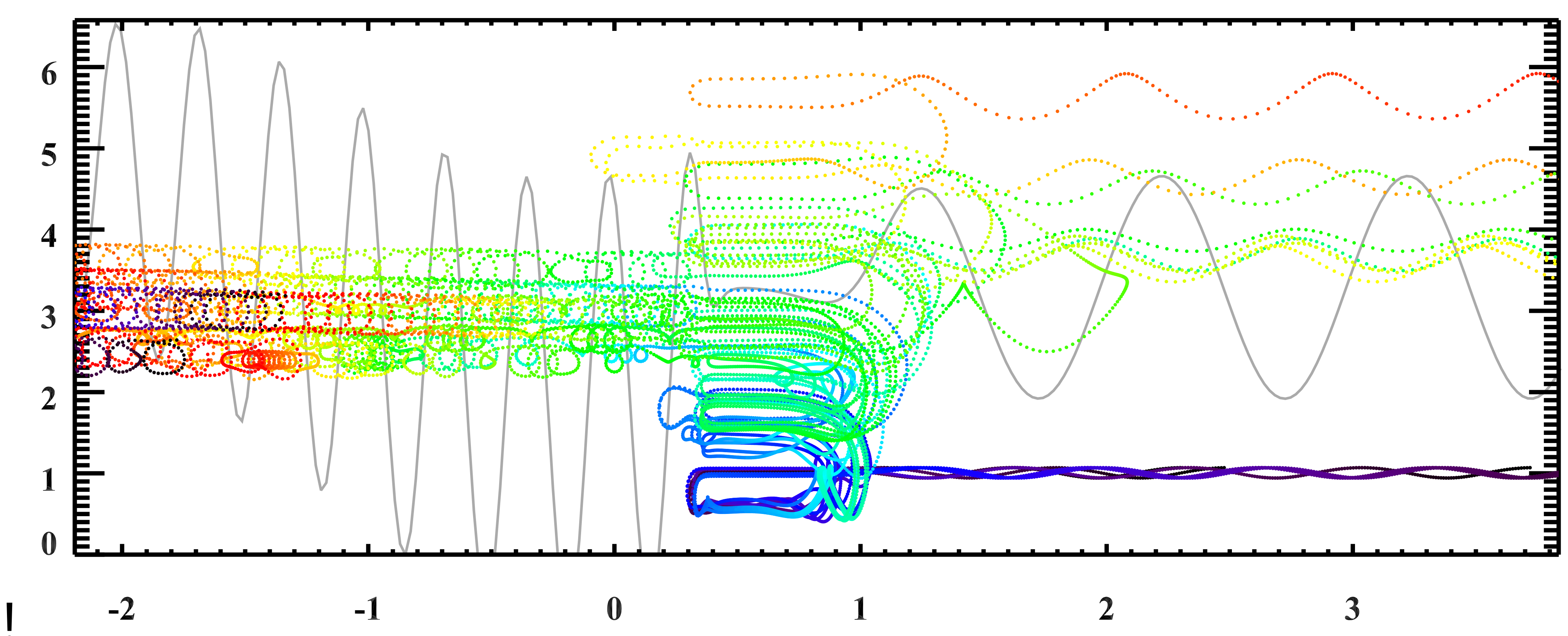


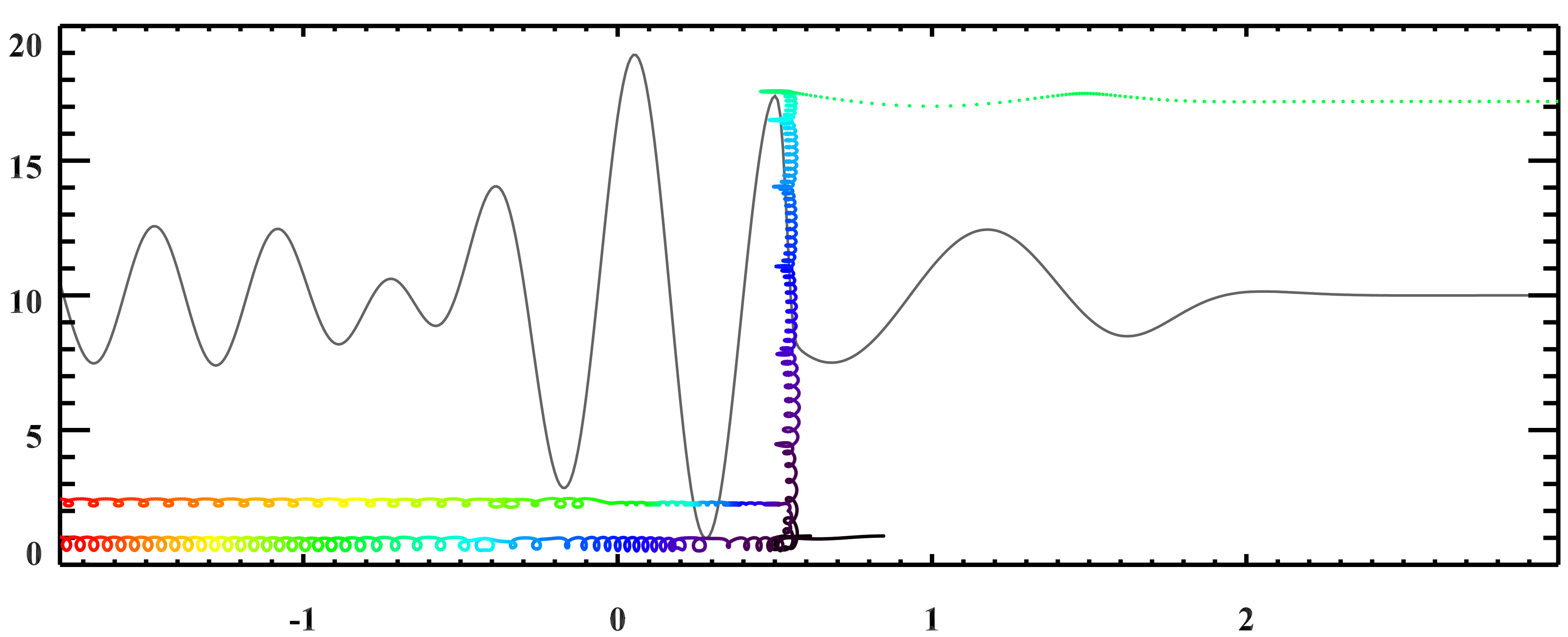
The MAGNETIC STRUCTURE ITSELF (without E_0!) provides an ONE-STEP THERMALIZATION of particles at the shock overshoot region.

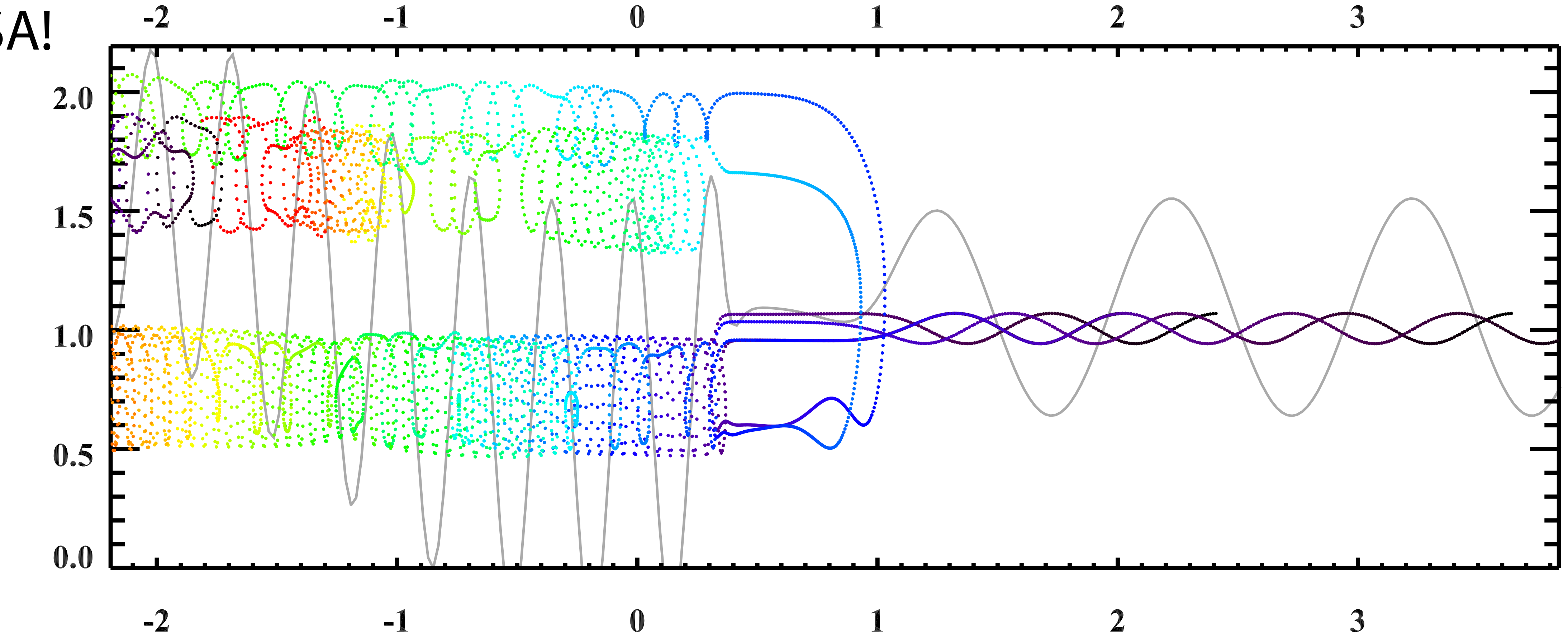
μ-DSA mechanism –> DSA on the scales of a particle gyro-radius.

It provides the energization of ions (no SDA!), and also the acceleration of electrons.

For transversley scattered ions and electrons, spiral-like trajectories in particle phase spectra are due to a very efficient acceleration by μ-DSA!





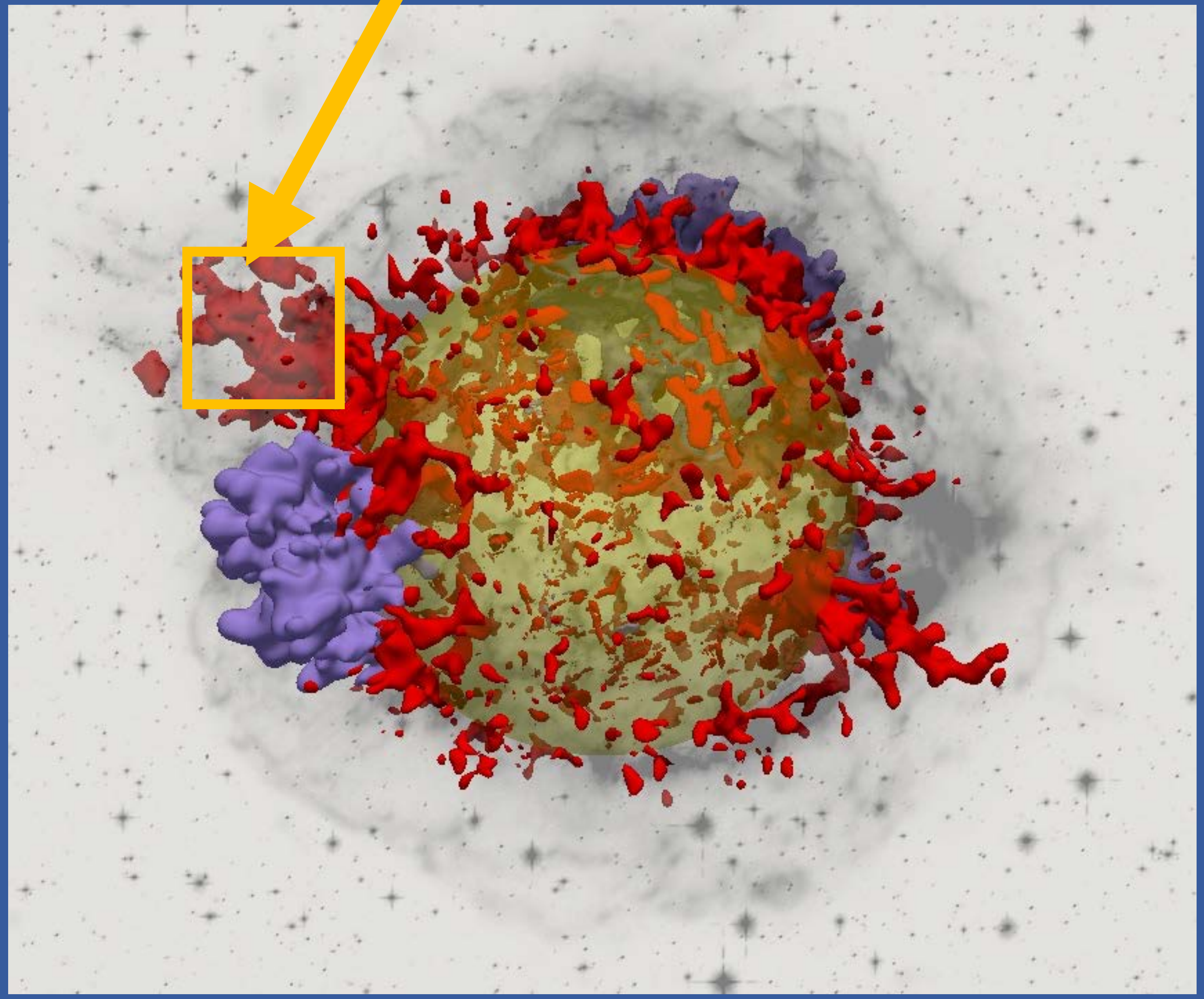


Studying the radiative recombination continua in the X-ray spectra of pure ejecta plasma

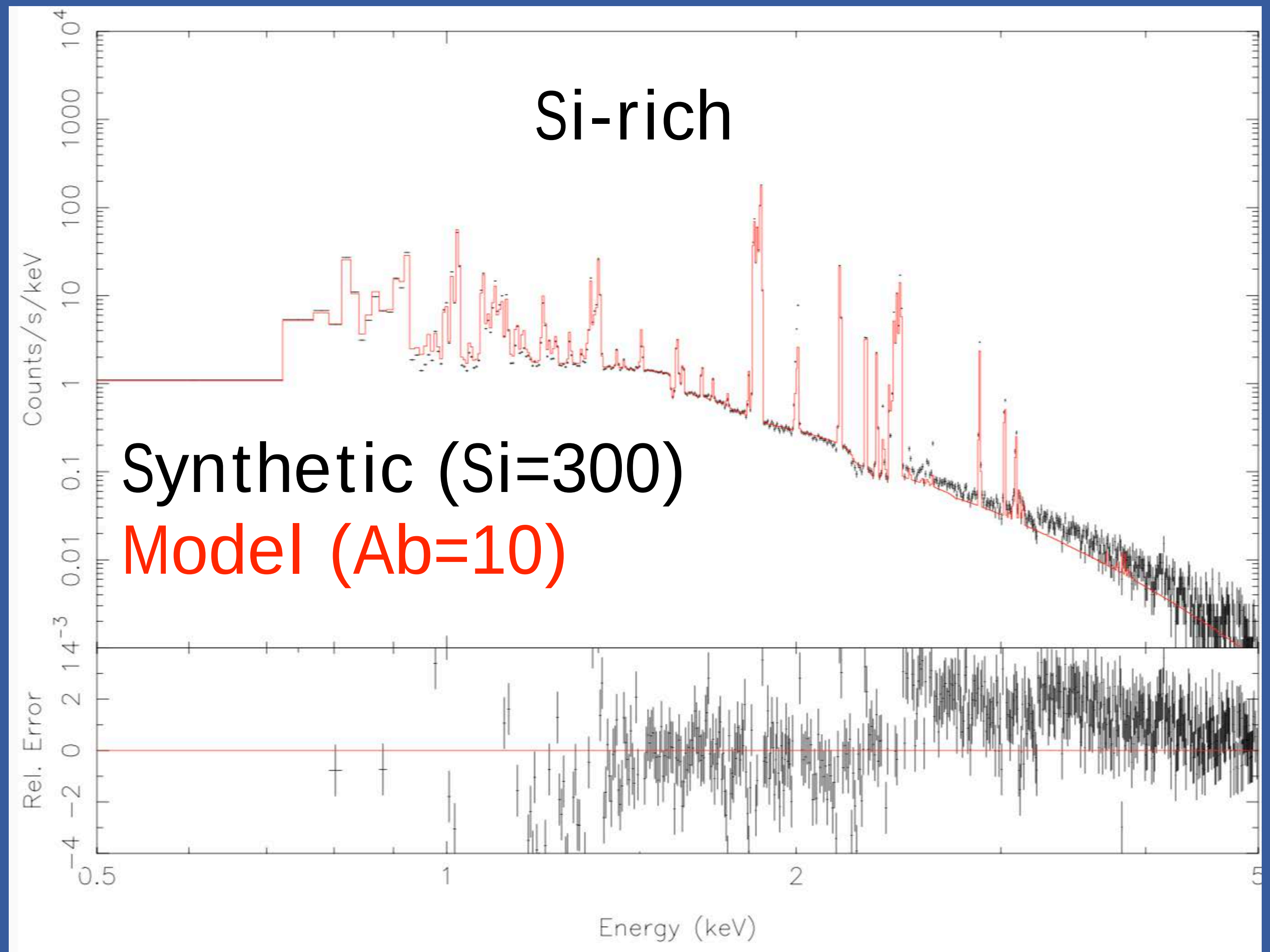
S5.4

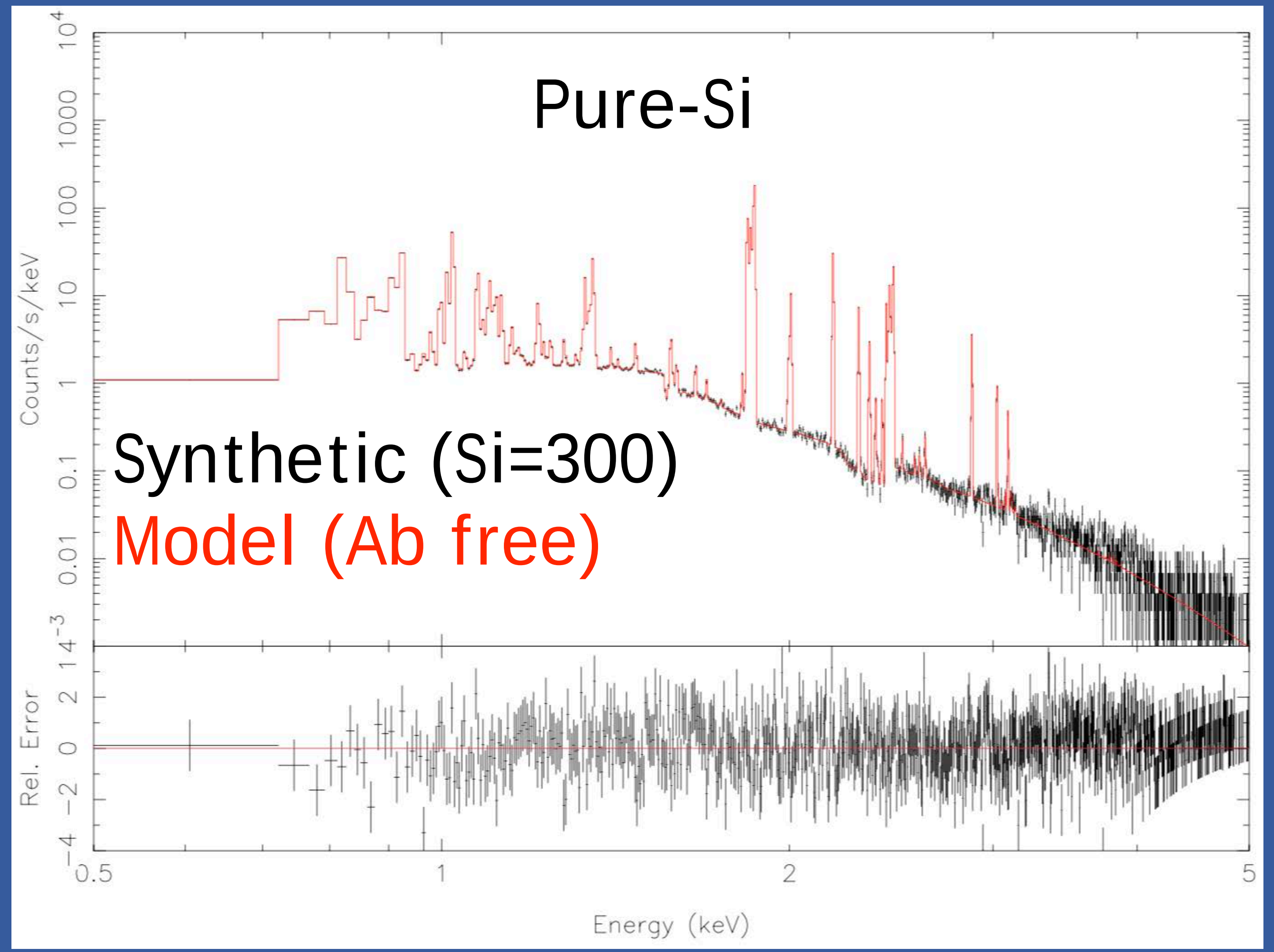
E. Greco[1,2,3], J. Vink[3,4], M. Miceli[1,2], V. Domcek[3,4], P. Zhou[3,5], S. Orlando[2], G.Peres[1,2], F. Bocchino[2]
[1]Università di Palermo, Dip. Di Fisica e Chimica,; [2]INAF-Osservatorio Astronomico di Palermo; [3]Anton Pannekoek Institut, University of Amsterdam; [4]GRAPPA, University of Amsterdam, [5]School of Astronomy and Space Science, Nanjing University

Cas A Jet (Orlando et al. 2016)

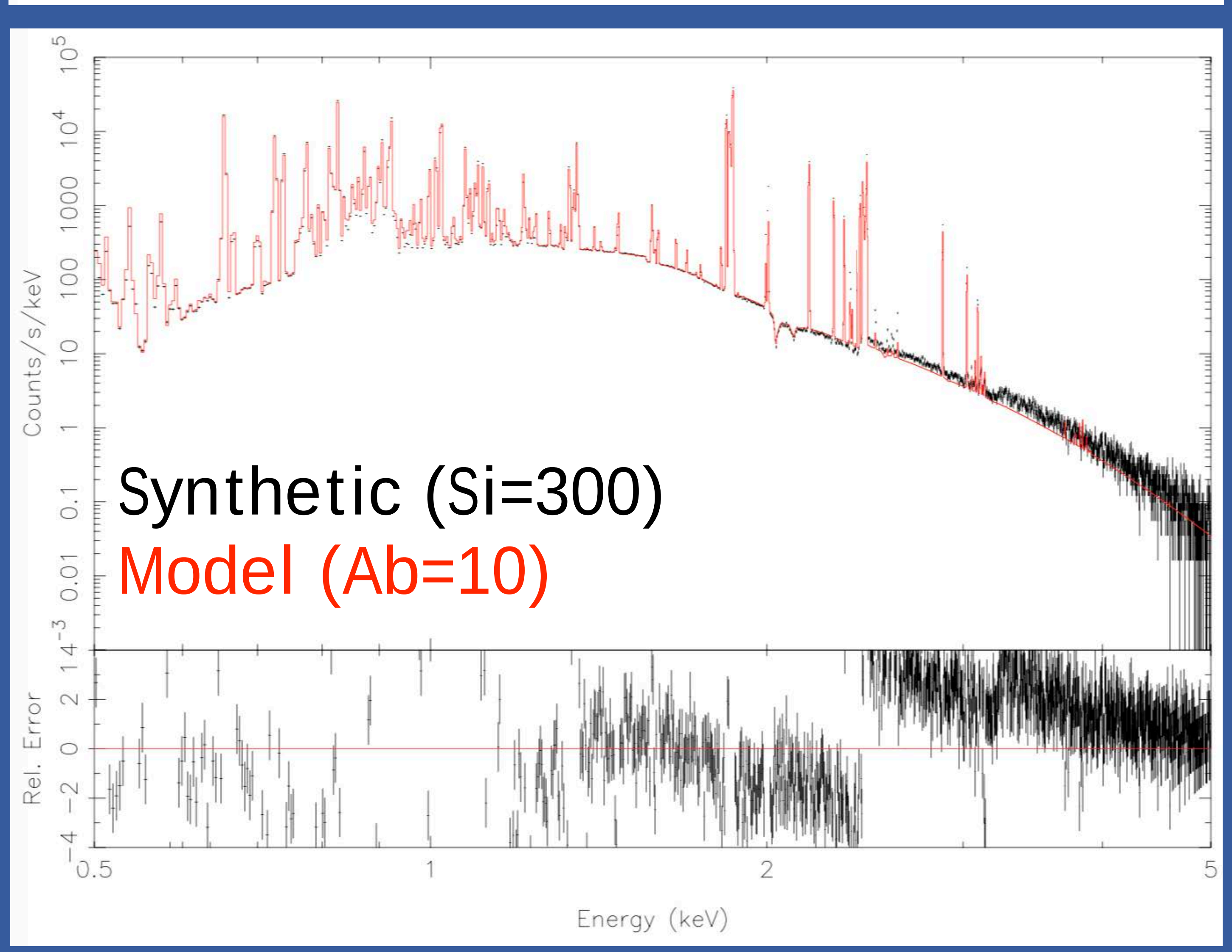


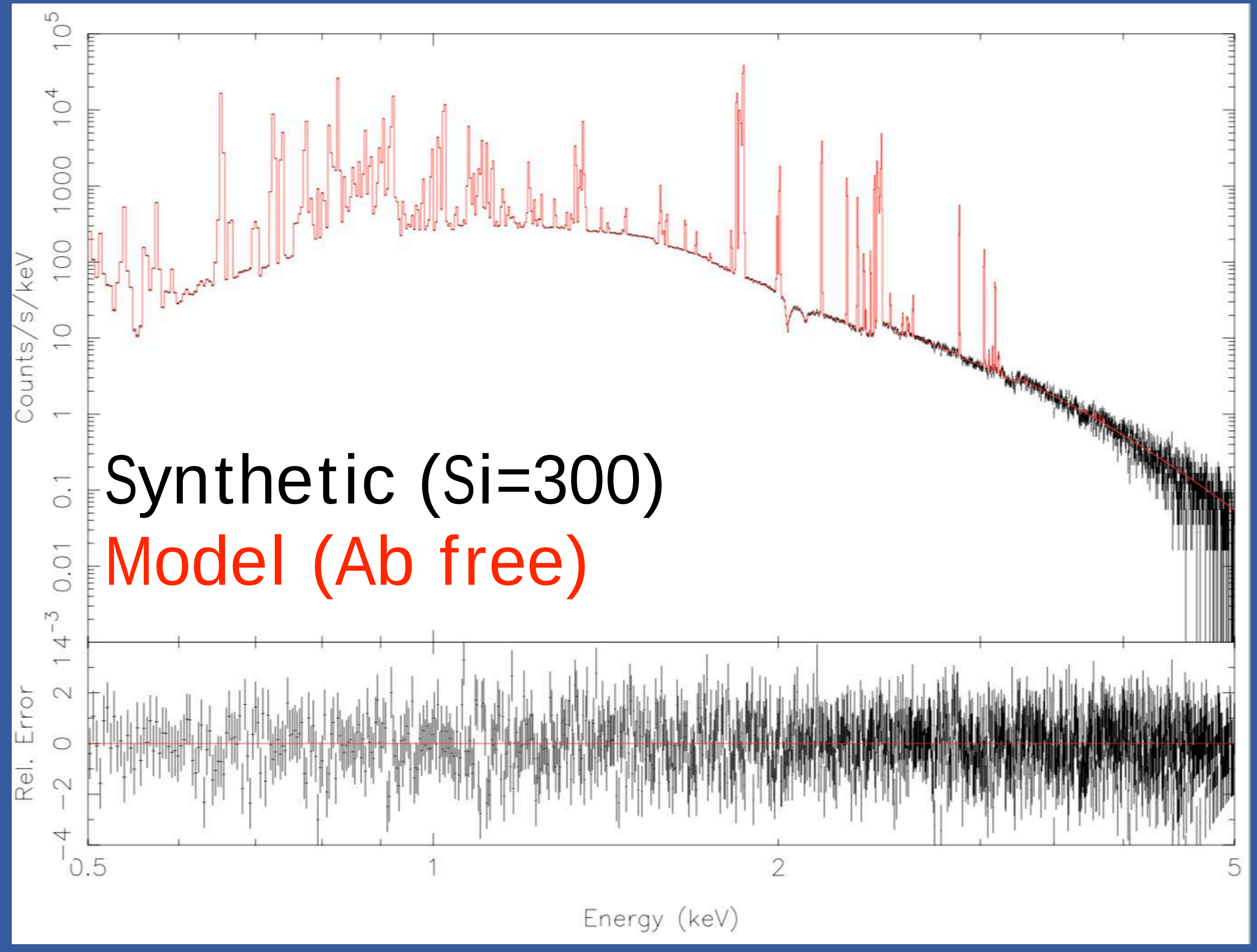
XRISM





X-IFU

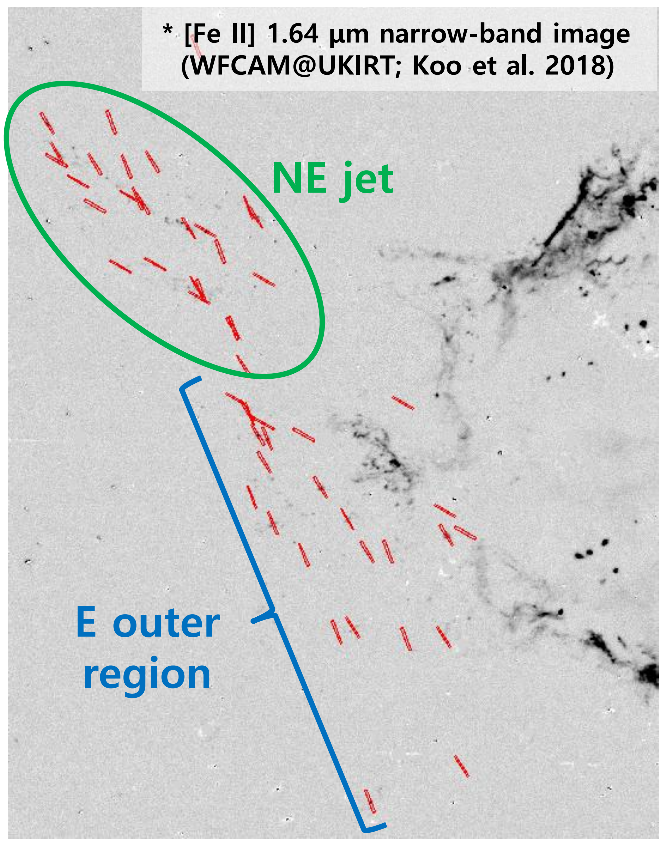


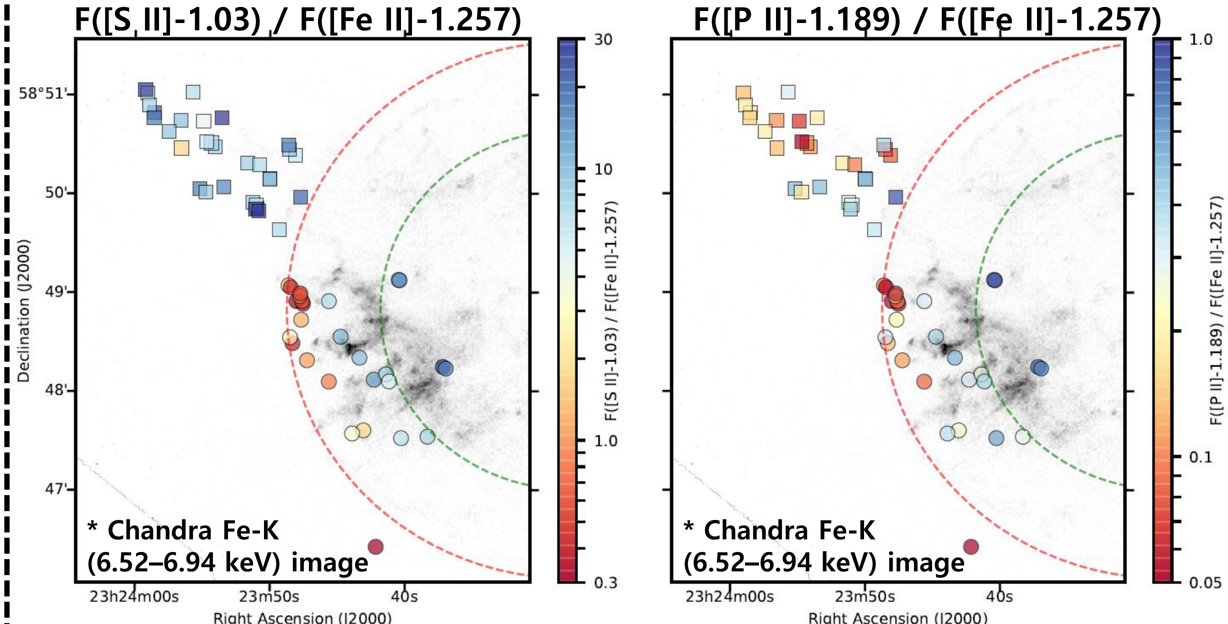


S5.6: NIR MOS of the Outer Ejecta Knots in Cas A

Yong-Hyun Lee, Bon-Chul Koo and Jae-Joon Lee

Observation Summary	
Instrument	**MMIRS** @ MMT 6-m
Wavelength Coverage	*** J-band (J+zJ): 0.95 ~ 1.50 um**
Resolving Power	* R ~1800 – 2200
Obs. Date	2017 Sept. 1--7





1. The Central Main Stream of the NE Jet

(1) strong [S II] and [Fe II] lines with no or little [P II] line

=> The NE jet was launched from a **"S-rich"** region near the progenitor's core.

2. The Knots in the E Outermost Region

(1) Only [Fe II] lines with/without He I line

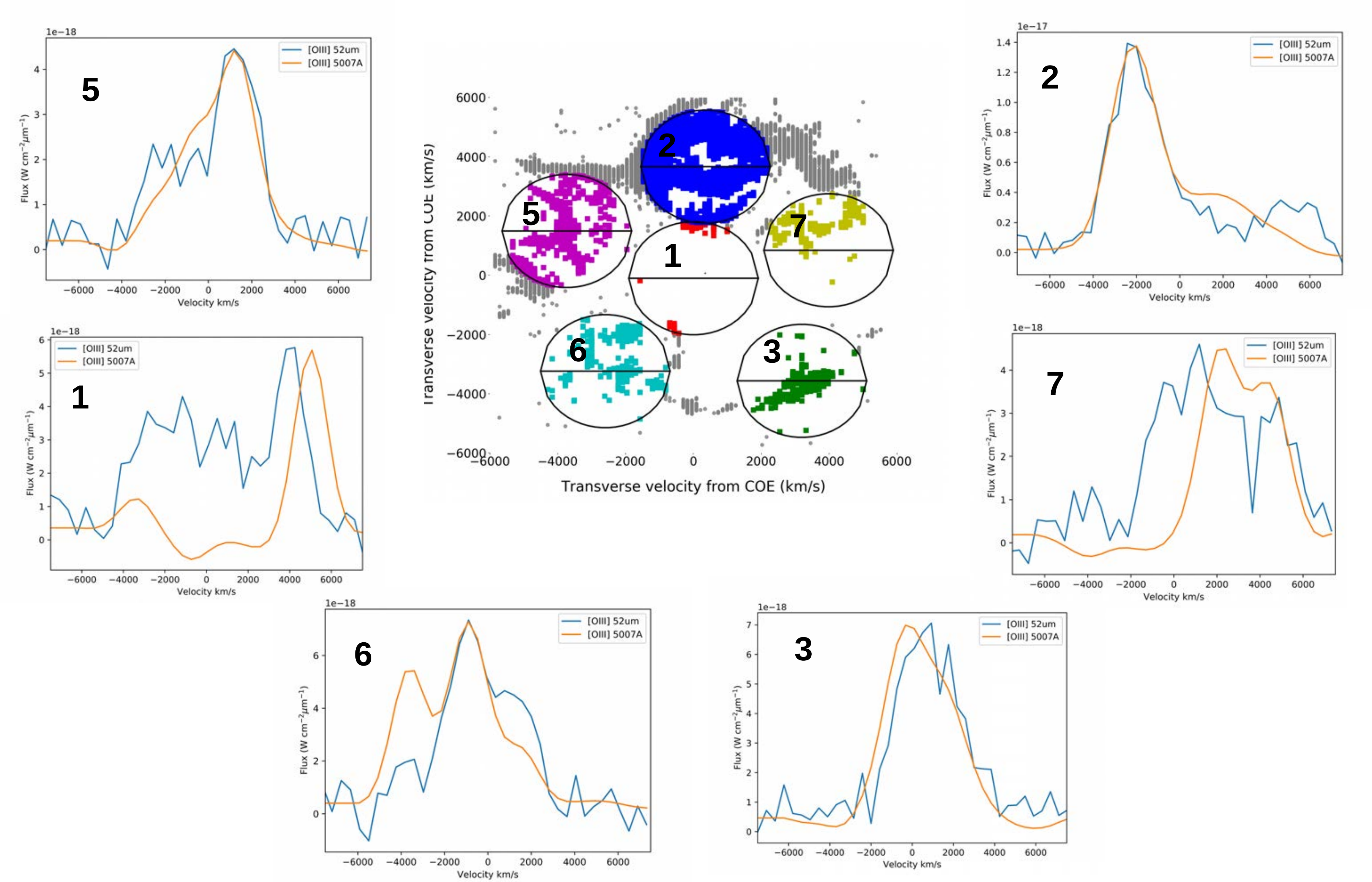
=> **dense Fe ejecta** from the innermost region

(2) Dense Fe ejecta at the tip of the diffuse Fe-K plume

=> small, dense Fe clumps formed during the explosion by R-T instability and decoupled from the diffuse Fe ejecta after encountering the reverse shock.

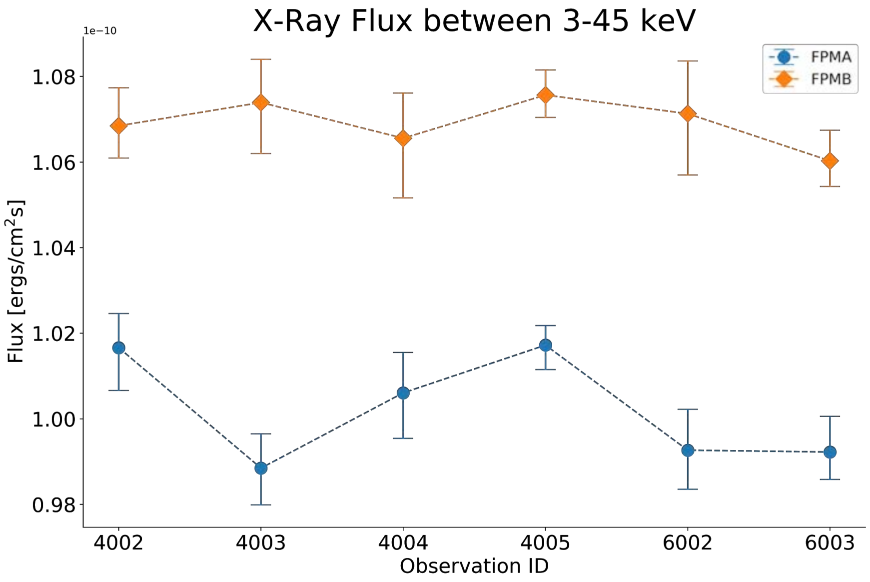
S5.7

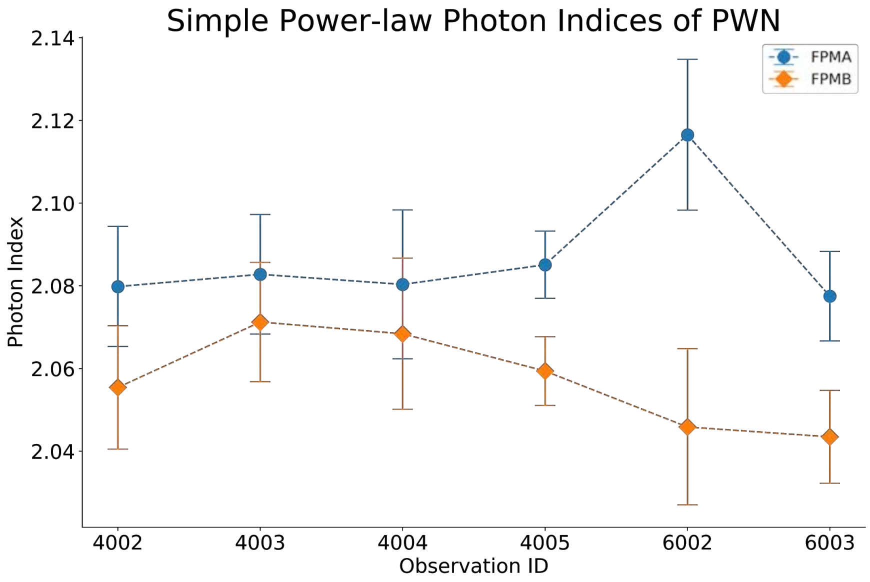
Inferring the location and mass of dust in Cassiopeia A from comparison of Optical [OIII] 5007Å and Infrared [OIII] 52μm line profiles



Revisiting G21.5-0.9's X-Ray Spectral Break in *NuSTAR* Data

Soichiro Hattori (**S6.5**)

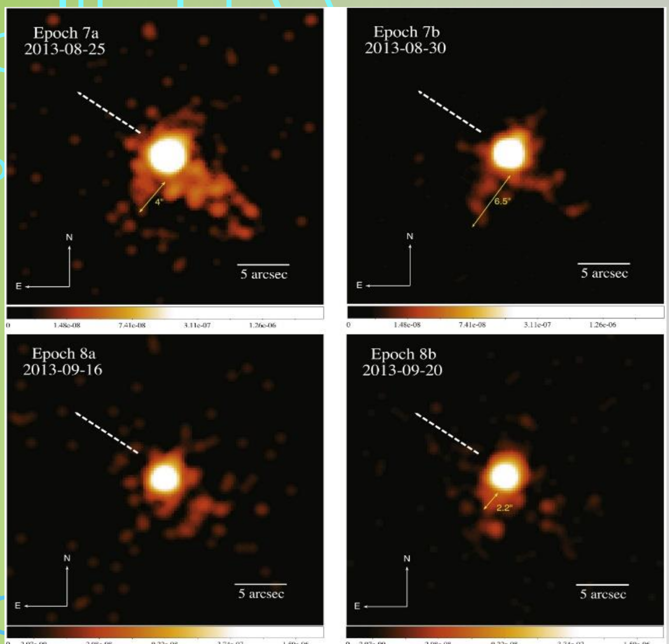




Rapid X-Ray Variations of the Geminga Pulsar Wind Nebula

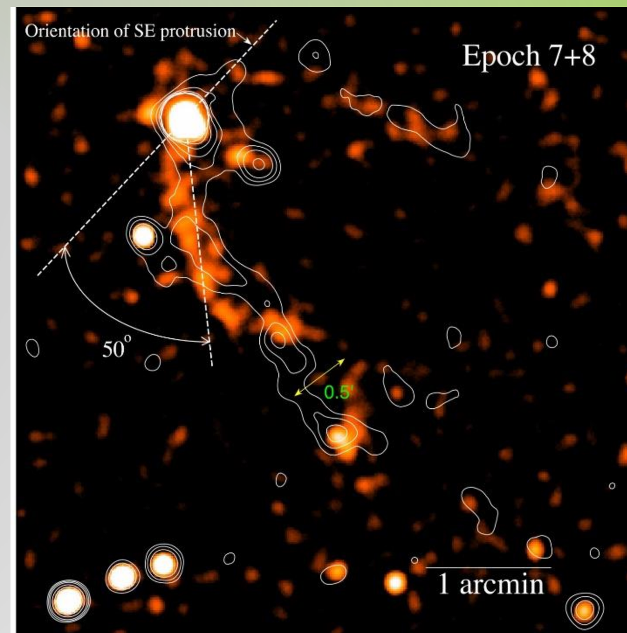
Jongsu Lee : Department of Space Science & Geology,
Chungnam National University, Korea

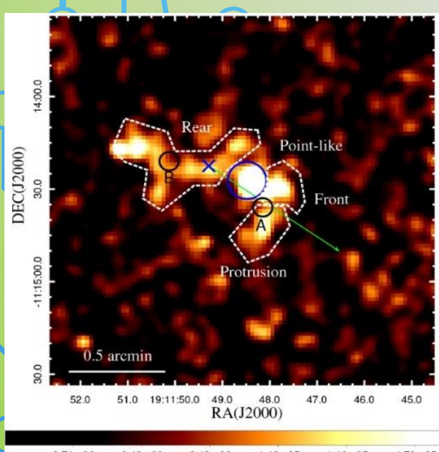
S6.6



← We can see the compact extended feature at perpendicular proper motion of Geminga. The variability of this feature occurred at a speed of ~0.8c.

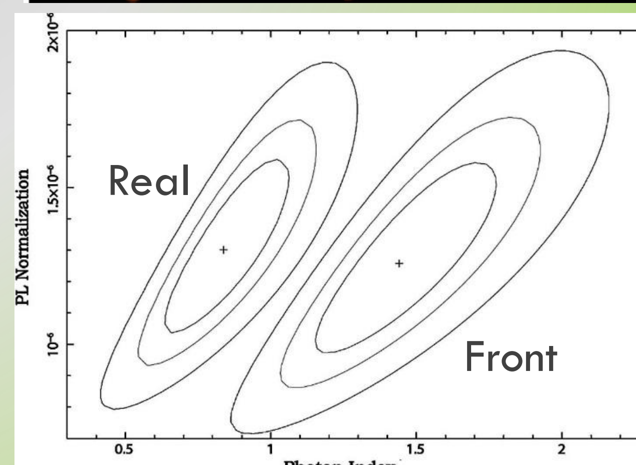
→ In Epochs 7 and 8, the southern tail is found to be significantly twisted with respect to the contours as an S-shaped structure. The twisting of the southern tail occurred at a speed of ~0.2c.





← We have discovered an extended X-ray feature, apparently associated with millisecond pulsar PSR J1911-1114.

→ We investigated the spectral hardening. The confidence contours are shown clearly shows the significant spectral variation along the southern outer tail.

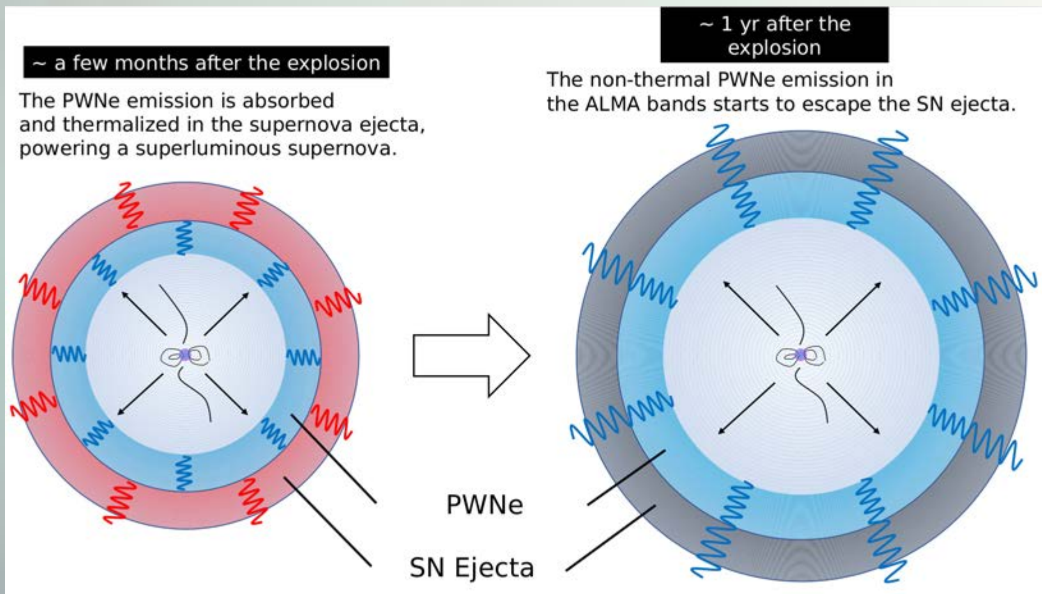


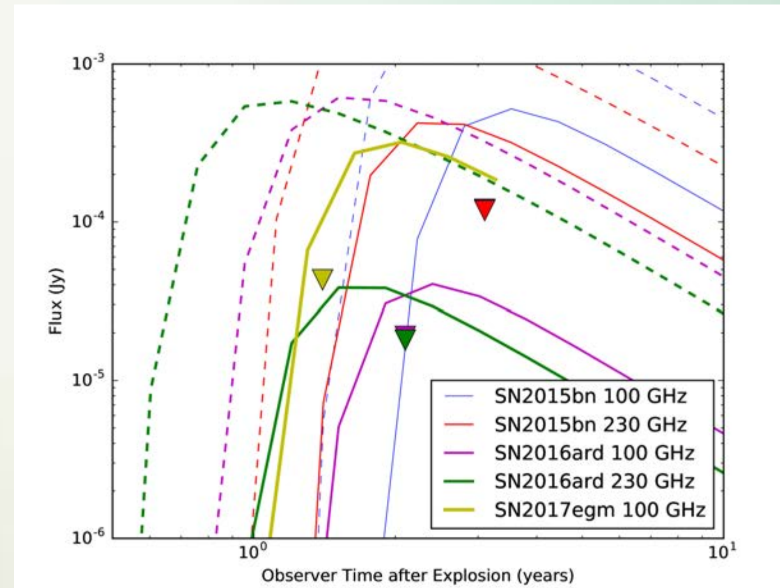
E-mail : skyljs1234@gmail.com

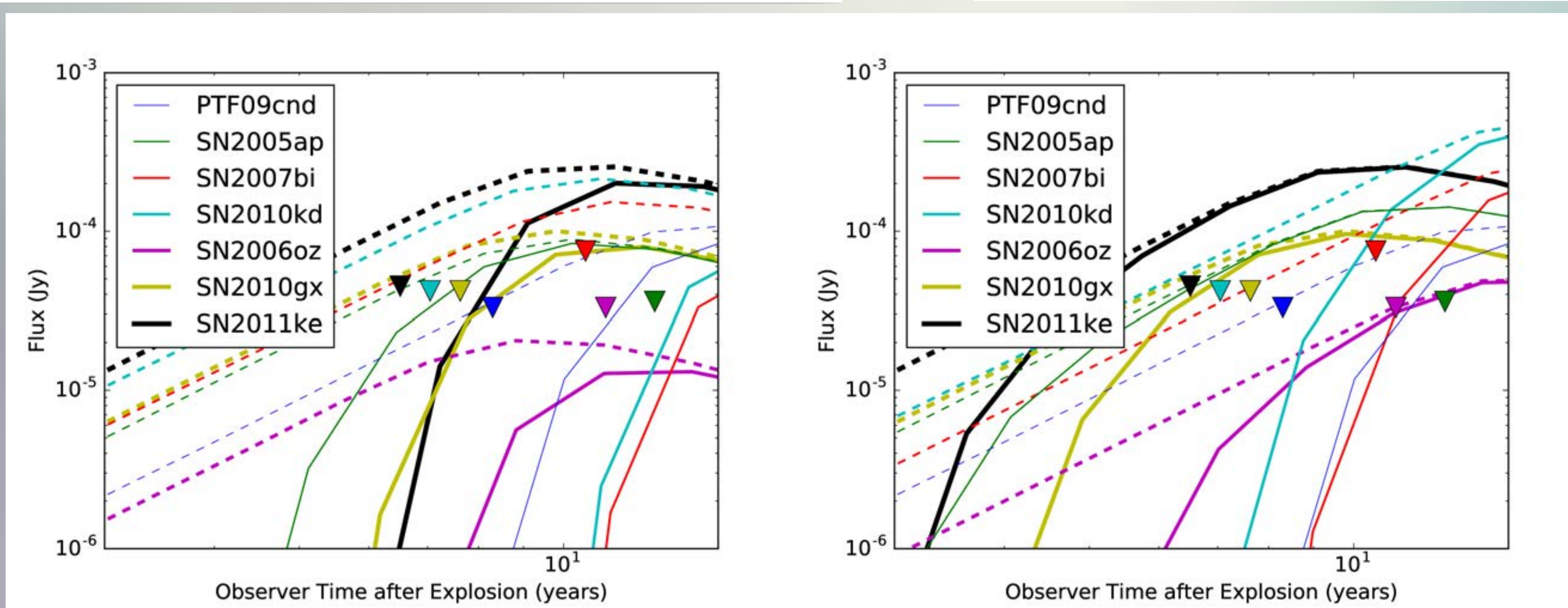
Radio and Submillimetre Constraints on the Pulsar-Driven Supernova Model

S6.8

Conor Omand et al.







O CEASAR: The Optical CAtalogue of Extragalactic SupernovA Remnants

S7.7

I. Moumen[1,2], C. Robert[1], D. Devost[2], L. Rousseau-Nepton[2,3], D. Patnaude[4], S. Safi-Harb[5], R.P. Martin[3], L. Drissen[1], and T. Martin[1]

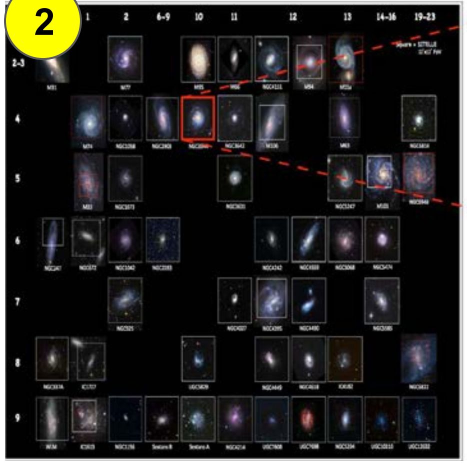
1 Université Laval, Québec (QC), Canada | 2 Canada-France-Hawaii Telescope, Waimea (HI), USA | 3 University of Hawaii at Hilo, Hilo (HI), USA | 4 Harvard-Smithsonian Center for Astrophysics, Boston (MA), USA | 5 University of Manitoba, Winnipeg (MB), Canada

1

O CAESAR

Optical CAtalog of Extragalactic SupernovA Remnants

2



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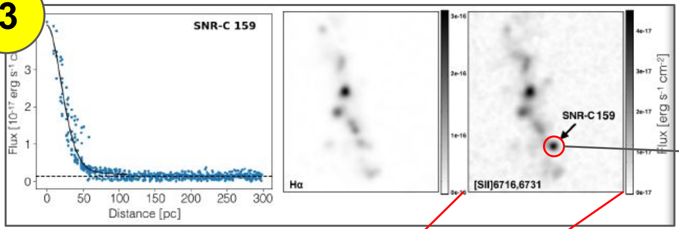

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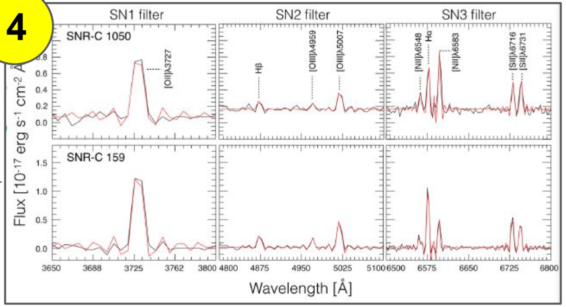

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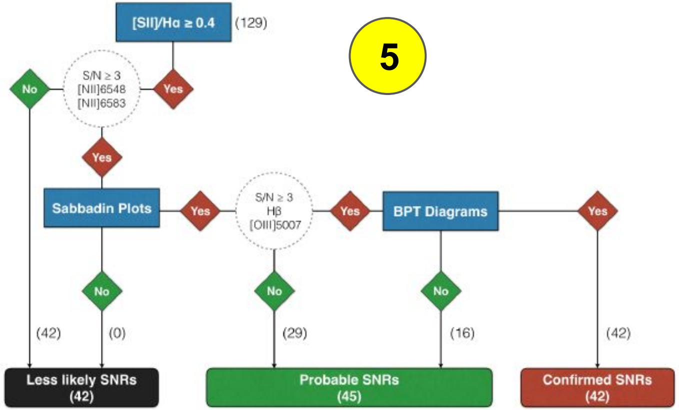
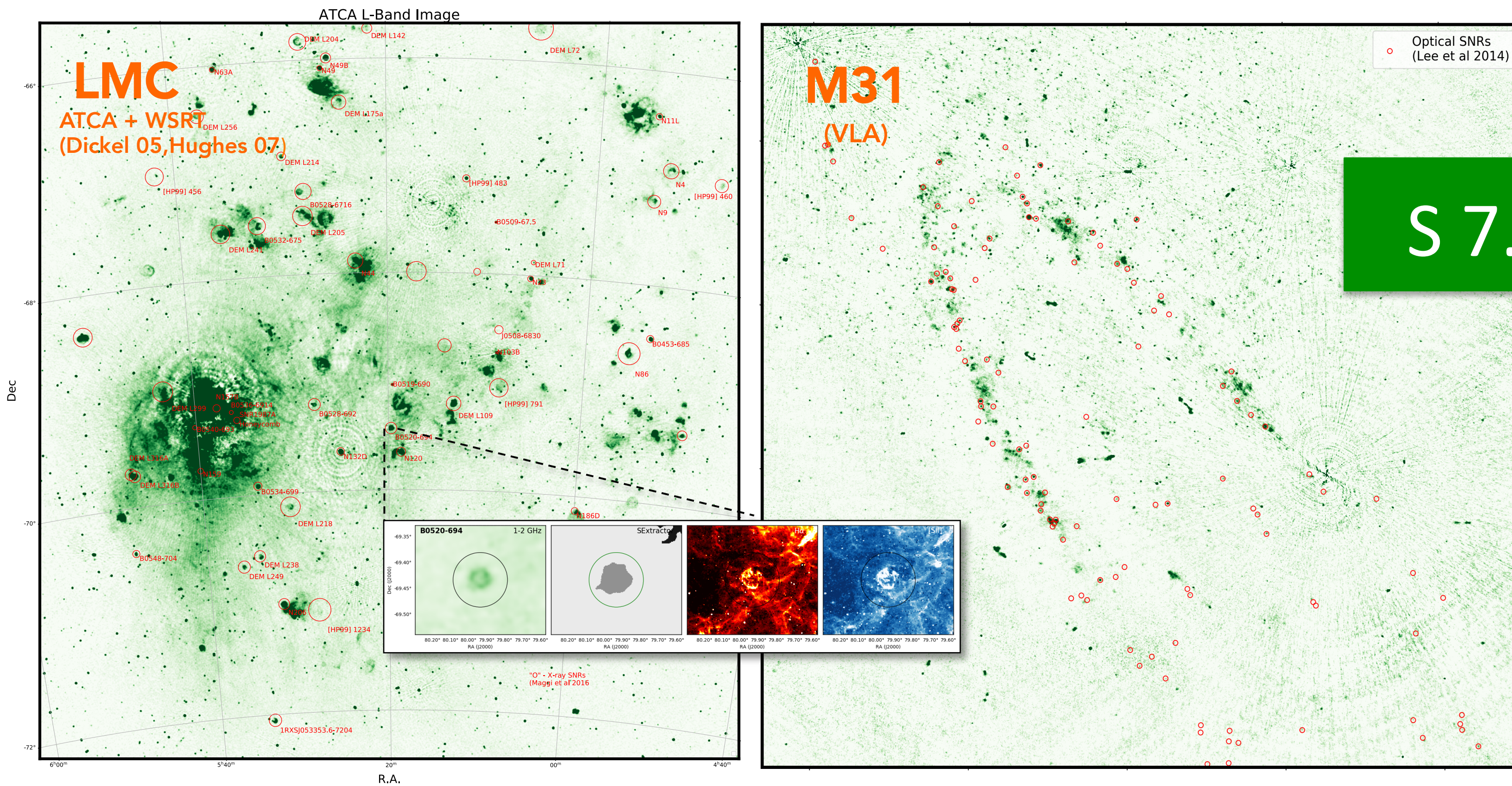


NGC 3344 is a part of SIGNALS survey. 129 SNR candidates were identified in this galaxy.

See our poster # S1.14

Systematic survey of supernova remnants from deep radio images: Magellanic Clouds and M31

Sumit K. Sarbadhicary, Laura Chomiuk, Jessica Maldonado (MSU), Preshant Jagannathan, Danny Huizenga, Carles Badenes (MSU), Adam Leroy (Ohio St.)



S 7.9