

Karsten Kretschmer

Dr. rer. nat.

16 Quai Fernand Saguet
94700 Maisons-Alfort
France

☎ +49-176-23821297

☎ +33-970244620

✉ kkretsch@apc.univ-paris7.fr

🏠 FACe, ResearchGate

Academic Positions

2012-09 – 2015-11

Postdoctoral Fellow, *François Arago Centre, Astroparticle and Cosmology Laboratory, Paris Diderot University, Paris.*

Postdoc in the INTEGRAL/ISGRI instrument team.

Activities:

- Improve the treatment of the instrumental background in ISGRI, model its time-dependent behaviour.
- Use their different time-dependence to separate the contributions of instrumental background, cosmic X-ray background and individual sources to measure the CXB spectrum with ISGRI.
- Identify cases where we lack understanding of the ISGRI data, e.g. dark pixels, hot pixels, incorrect efficiency estimates.

2011-05 – 2012-08

Postdoctoral Fellow, *Max Planck Institute for extraterrestrial Physics, Garching.*

Kinematics of ^{26}Al in the inner Galaxy

2001-02 – 2011-05

Graduate Student, *Max Planck Institute for extraterrestrial Physics, Garching.*

High-Resolution spectroscopy of astrophysical gamma-ray lines in the INTEGRAL/SPI team

Degrees

- 2011-09-13 **Doctorate**, *Department of Physics, Technical University Munich*, Garching.
Dissertation, “High-Resolution Spectroscopy of Astrophysical Gamma-Ray Lines”, advisor: Roland Diehl, Max-Planck-Institut für extraterrestrische Physik
Activities:
- Modelling of gamma-ray line shapes due to Doppler broadening in supernova remnants, superbubbles, the Galactic plane, ...
 - Measurement of Doppler shifts and Doppler broadening of the ^{26}Al line from the inner Galaxy with SPI
 - Calibration of the time-dependent energy response of SPI
- 2000-11-27 **Diploma**, *Department of Physics, Technical University Munich*, Garching.
“Models for understanding nucleosynthesis in stellar associations”, supervisor: Volker Schönfelder, Max-Planck-Institut für extraterrestrische Physik
Activities:
- Modelling of the mass loss, radioactive ejecta, kinetic energy and ionizing radiation emitted by a stellar association of given composition.
 - Quantify the effects of small sample statistics on the uncertainties of these models.

INTEGRAL Proposals

PI

AO-2 0220122 “Locating ^{26}Al Sources in the Galaxy”

Col

AO-2 0220116 “Massive Stars of Orion OB1 and the ISM”
AO-3 0320069 “Massive Stars of Orion OB1 and the ISM”
AO-4 0430045 “Nucleosynthesis Lines from the Inner Galaxy”
AO-7 0730086 “ ^{26}Al from the Closest Massive Stars: Sco-Cen”
AO-13 1330002 “ ^{26}Al line shift from the closest massive star group”

Interests

massive stars	stellar evolution, nucleosynthesis, influence on their surroundings
stellar groups	small number statistics, age determination, regions where they form, superbubble formation
gamma-ray astronomy	data analysis methods, instrument design, calibration methods
extragalactic background	SED measurement, source populations, emission processes
statistics	probability theory, Bayesian methods, Markov chain Monte-Carlo
computing	software design, statistical methods, free/open source software, system administration, automation, virtualization, “vintage” computing, keeping legacy systems operational
technology	electronics, aerospace technology, aviation
other	science fiction literature, history of technology, computing history, photography, mountain hiking, rock climbing, jazz music, cognition

Languages

German	native
English	fluent
French	conversational

Computer Knowledge

programming language	Ruby, Python, IDL, Julia, C, C++, Shell, SQL
version control	Git, Subversion, Mercurial, CVS
database	MySQL, PostgreSQL, SQLite
operating system	Linux, FreeBSD, OpenBSD, Solaris, Windows, OS X, DOS, OS/2
virtualization	Qemu/KVM, Linux Containers, OpenVZ, libvirt

Publications

online information FAcE, NASA ADS, ResearchGate, GitHub

First author articles in refereed journals

- Kretschmer, K., R. Diehl, M. Krause, et al. “Kinematics of massive star ejecta in the Milky Way as traced by ^{26}Al ”. In: *A&A* 559, A99 (Nov. 2013), A99. DOI: 10.1051/0004-6361/201322563. arXiv: 1309.4980 [astro-ph.HE].
- Kretschmer, K., R. Diehl, and D. H. Hartmann. “Line shape diagnostics of Galactic ^{26}Al ”. In: *A&A* 412 (Dec. 2003), pp. L47–L51. DOI: 10.1051/0004-6361:20034604. eprint: astro-ph/0311218.

Conference contributions

- Kretschmer, K. “Time-dependent Background in ISGRI”. In: *INTEGRAL 2015, Rome*. Oct. 2015. DOI: 10.13140/RG.2.1.3398.8880.
- Kretschmer, K., V. Savchenko, and F. Lebrun. “The Cosmic X-ray Background up to 1 MeV”. In: *10th INTEGRAL Workshop, Annapolis, MD*. Sept. 2014. DOI: 10.13140/RG.2.1.3881.6407.
- Kretschmer, K., R. Diehl, and M. Krause. “Kinematics of massive star ejecta in the Milky Way as traced by ^{26}Al ”. In: *INTEGRAL 2013, Rome*. Oct. 2013. DOI: 10.13140/RG.2.1.5192.3601.
- Kretschmer, K. “Velocities of ^{26}Al in the inner Galaxy”. In: *Proceedings of “An INTEGRAL view of the high-energy sky (the first 10 years)” - 9th INTEGRAL Workshop and celebration of the 10th anniversary of the launch (INTEGRAL 2012). 15-19 October 2012. Bibliotheque Nationale de France, Paris, France*. 2012, p. 110. URL: <http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=176>.
- Kretschmer, K., R. Diehl, and W. Wang. “The distribution and kinematics of massive stars in the inner Galaxy mapped with SPI/INTEGRAL ^{26}Al 1.8 MeV line observations”. In: *Astronomische Nachrichten* 328 (Sept. 2007), p. 642.
- Kretschmer, K. “Observing nuclear gamma-ray lines from the Galaxy with SPI/INTEGRAL”. In: *Intersections of Particle and Nuclear Physics: 9th Conference CIPAN2006*. Ed. by T. M. Liss. Vol. 870. American Institute of Physics Conference Series. Nov. 2006, pp. 174–177. DOI: 10.1063/1.2402611.
- Kretschmer, K. et al. “ ^{26}Al spectroscopy with SPI: The challenge to detect Galactic rotation”. In: *Advances in Space Research* 38 (Jan. 2006), pp. 1439–1442. DOI: 10.1016/j.asr.2006.09.027.
- Kretschmer, K. “Line spectroscopy from ^{26}Al source regions”. In: *Internal INTEGRAL Science Workshop*. Jan. 2005, p. 34.
- Kretschmer, K., R. Diehl, and D. H. Hartmann. “Line Shape Diagnostics of Galactic ^{26}Al ”. In: *5th INTEGRAL Workshop on the INTEGRAL Universe*. Ed. by V. Schoenfelder, G. Lichti, and C. Winkler. Vol. 552. ESA Special Publication. Oct. 2004, p. 103.
- Kretschmer, K. et al. “ ^{26}Al spectroscopy with SPI: the challenge to detect Galactic rotation”. In: *35th COSPAR Scientific Assembly*. Ed. by J.-P. Paillé. Vol. 35. COSPAR Meeting. 2004, p. 2698.

- Kretschmer, K. et al. “Radioactive ^{26}Al in the Cygnus Region”. In: *Astronomische Nachrichten Supplement* 324 (July 2003), p. 76.
- “The Shapes of Gamma-Ray Lines from Radio-actives - Prospects for INTEGRAL”. In: *Astronomische Nachrichten Supplement* 324 (July 2003), p. 19.
- Kretschmer, K., R. Diehl, S. Plueschke, et al. “Radioactive ^{26}Al in the Cygnus r”. In: *Astronomische Gesellschaft Abstract Series*. Vol. 19. Astronomische Gesellschaft Abstract Series. 2002, pp. 100–100.
- Kretschmer, K., R. Diehl, S. Plüschke, D. Ellison, et al. “Groups of Massive Stars and Gamma-ray Line Shape”. In: *Astronomische Gesellschaft Meeting Abstracts*. Ed. by E. R. Schielicke. Vol. 18. Astronomische Gesellschaft Meeting Abstracts. 2001, p. 206.
- Kretschmer, K., D. C. Ellison, et al. “Radioactivity gamma-ray line shape and cosmic-ray acceleration”. In: *International Cosmic Ray Conference* 6 (Aug. 2001), p. 2077.
- Kretschmer, K., S. Plüschke, et al. “OB Associations: Linking Radioactivities to other Observables”. In: *Astronomische Gesellschaft Meeting Abstracts*. Ed. by R. E. Schielicke. Vol. 17. Astronomische Gesellschaft Meeting Abstracts. 2000, p. 6.

Co-authored articles in refereed journals

- Krause, M. G. H. et al. “ ^{26}Al kinematics: superbubbles following the spiral arms?. Constraints from the statistics of star clusters and HI supershells”. In: *A&A* 578, A113 (June 2015), A113. DOI: 10.1051/0004-6361/201525847. arXiv: 1504.03120.
- Wang, W., M. G. Lang, et al. “Spectral and intensity variations of Galactic ^{26}Al emission”. In: *A&A* 496 (Mar. 2009), pp. 713–724. DOI: 10.1051/0004-6361/200811175. arXiv: 0902.0211 [astro-ph.HE].
- Wang, W., M. J. Harris, et al. “SPI observations of the diffuse ^{60}Fe emission in the Galaxy”. In: *A&A* 469 (July 2007), pp. 1005–1012. DOI: 10.1051/0004-6361:20066982. arXiv: 0704.3895.
- Diehl, R., H. Halloin, K. Kretschmer, G. G. Lichti, et al. “Radioactive ^{26}Al from massive stars in the Galaxy”. In: *Nature* 439 (Jan. 2006), pp. 45–47. DOI: 10.1038/nature04364. eprint: astro-ph/0601015.
- Diehl, R., H. Halloin, K. Kretschmer, A. W. Strong, et al. “ ^{26}Al in the inner Galaxy. Large-scale spectral characteristics derived with SPI/INTEGRAL”. In: *A&A* 449 (Apr. 2006), pp. 1025–1031. DOI: 10.1051/0004-6361:20054301. eprint: astro-ph/0512334.
- Diehl, R., J. Knödseder, et al. “SPI measurements of Galactic ^{26}Al ”. In: *A&A* 411 (Nov. 2003), pp. L451–L455. DOI: 10.1051/0004-6361:20031347. eprint: astro-ph/0309097.