



Stéphane Blondin (LAM)
Florent Castellani (IRAP)

Presentations by the participants



Stéphane Blondin (CNRS researcher at LAM)

- **A globe-trotter ...**

- 2002 : Master of Physics, University of Southampton, [UK](#)
- 2002-2005 : PhD in Astronomy, Ludwig-Maximilians Universität München (LMU), [Germany](#)
 - *Thesis title: Optical Spectra of Thermonuclear Supernovae in the Local and Distant Universe*
- 2005-2008 : Postdoctoral Fellow, Harvard-Smithsonian Center for Astrophysics (CfA), Cambridge, [USA](#)
- 2008-2010 : ESO Fellow, European Southern Observatory, Garching bei München, [Germany](#)
- Since 2010 : Associate Researcher of the CNRS at LAM, [France](#)
- 2018-2021 : Visiting Professor, Laboratoire Franco-Chilien d'Astronomie (LFCA), Santiago, [Chili](#)

- **... a sportsman ...**

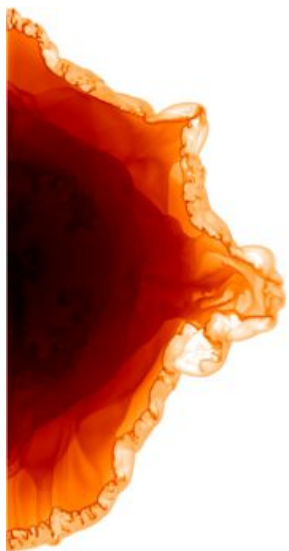
- Running
- Trail
- Triathlon

- **... a researcher still in movement**

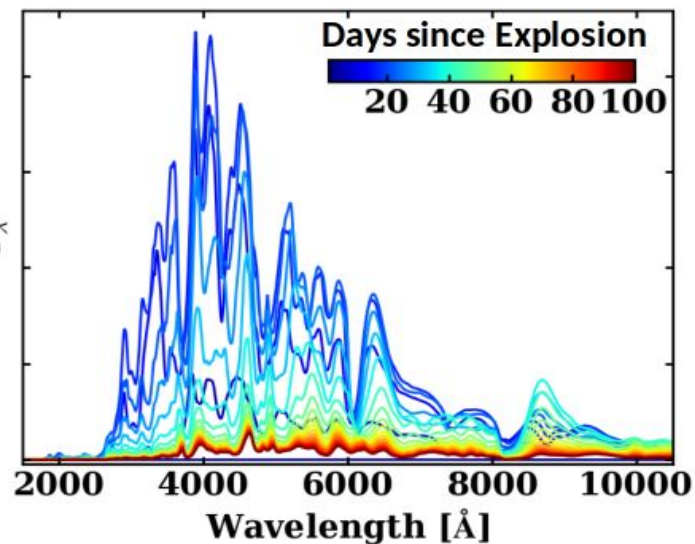
- From Optical to X-rays

His current research work

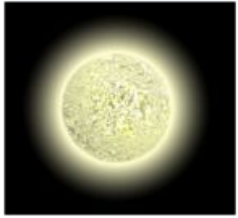
- Predict the Radiative Transfer (light curves, spectra, ...) of a Type Ia SN from hydrodynamical model of the explosion



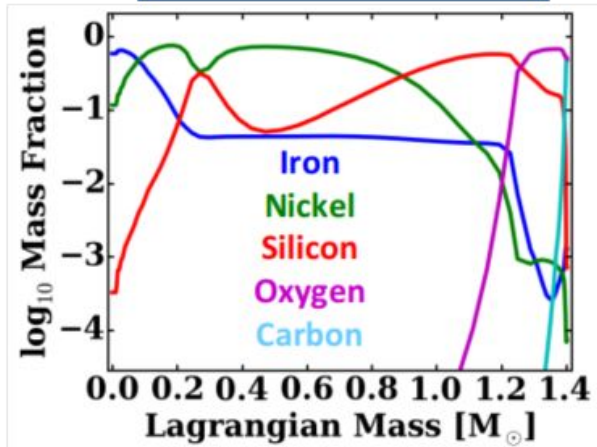
Radiative Transfer



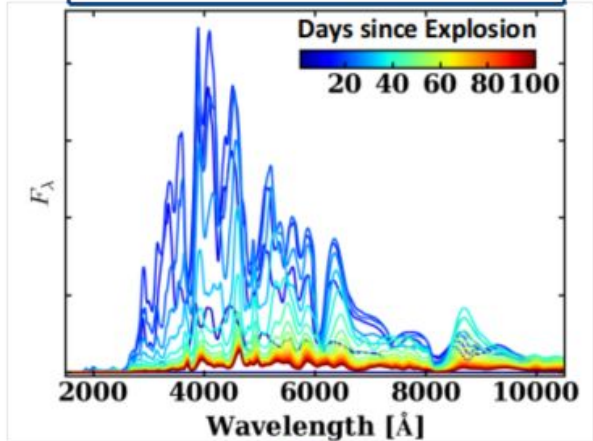
1. C-O WD
Hydrostatic
 $X_C \approx X_O \approx 0.5$



2. Explosion
1D hydro + burning
Homologous expansion
 $V(r) \propto r$ @ $t_{\text{exp}} < 1$ min

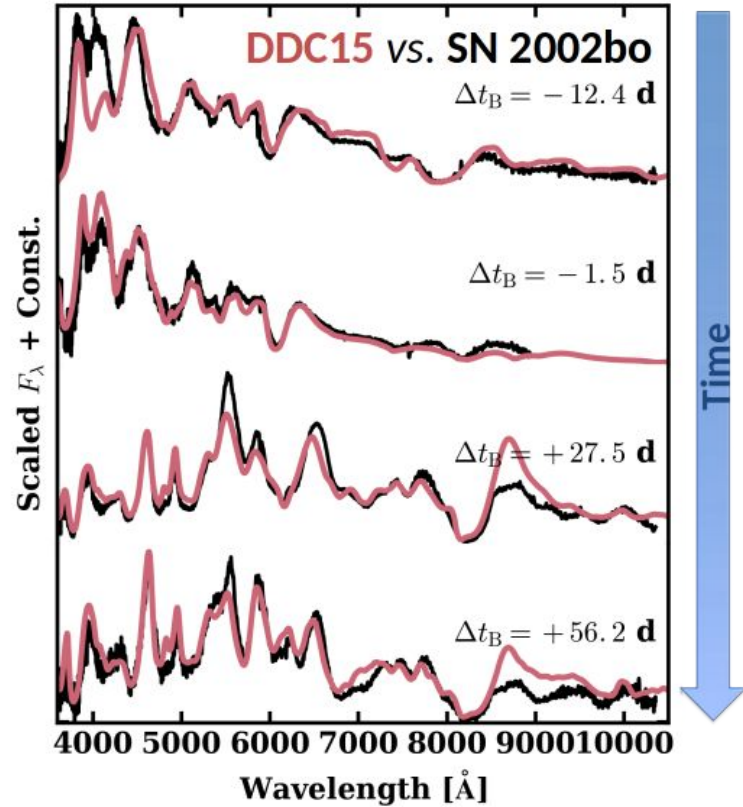
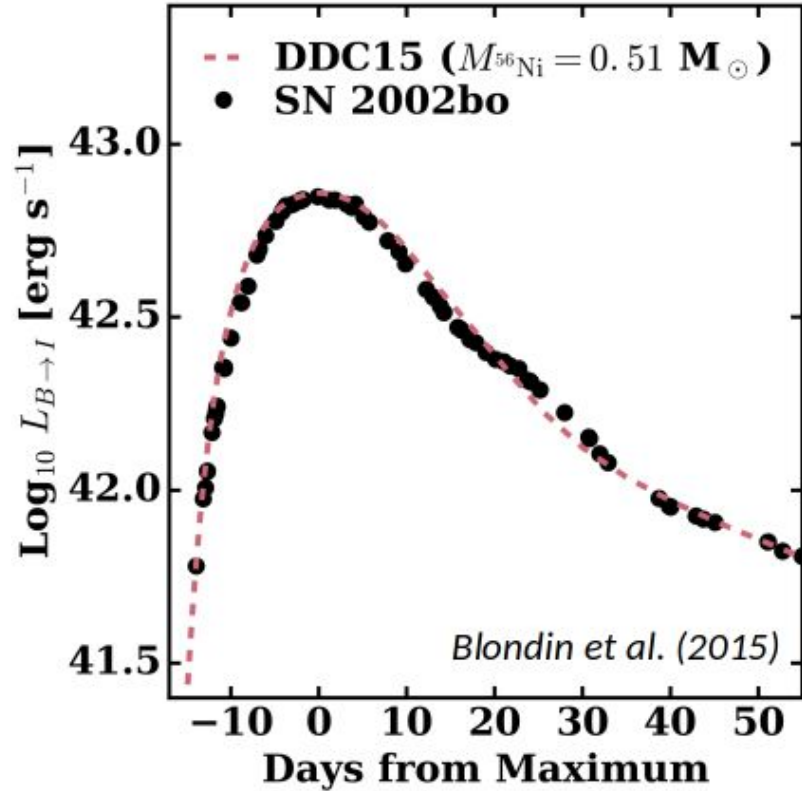


3. Radiative Transfer
1D non-LTE (CMFGEN)
Time-dependent D/Dt
Non-local energy deposition
Non-thermal processes

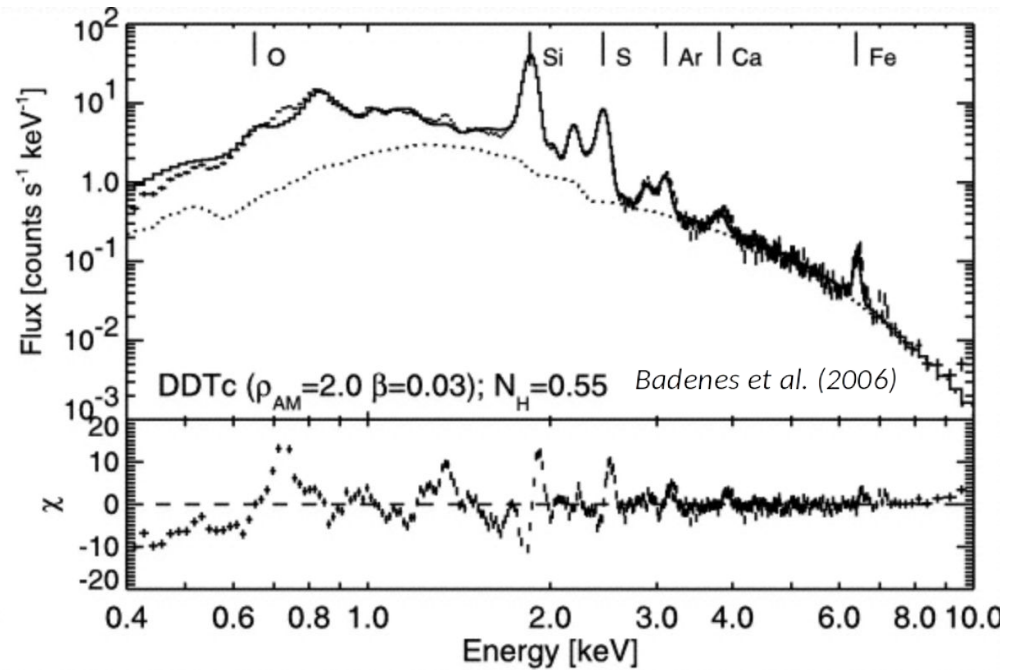
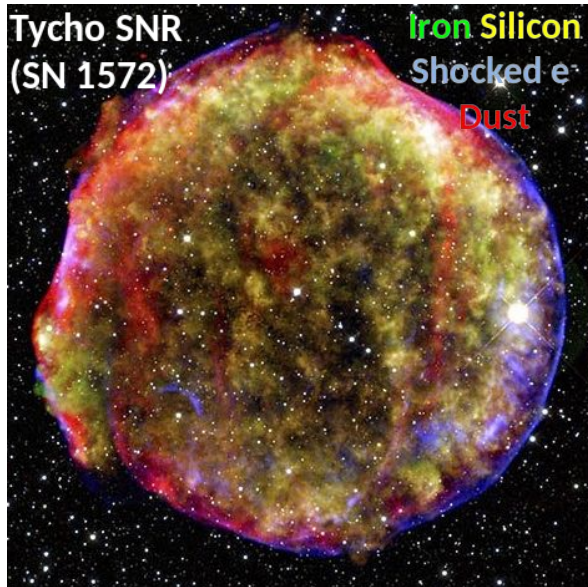


4. Comparison to Observations

Hillier & Dessart (2012)



His future work



- Asymmetric effects
- Constraints on spatially resolved chemical abundances

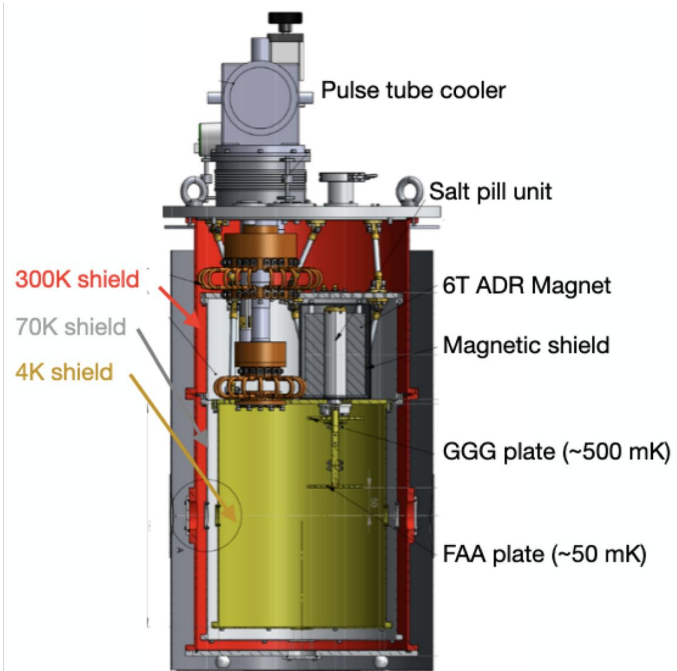
Florent Castellani (PhD candidate at IRAP)

2nd year PhD student (supervisors: Etienne Pointecouteau & François Pajot, IRAP)

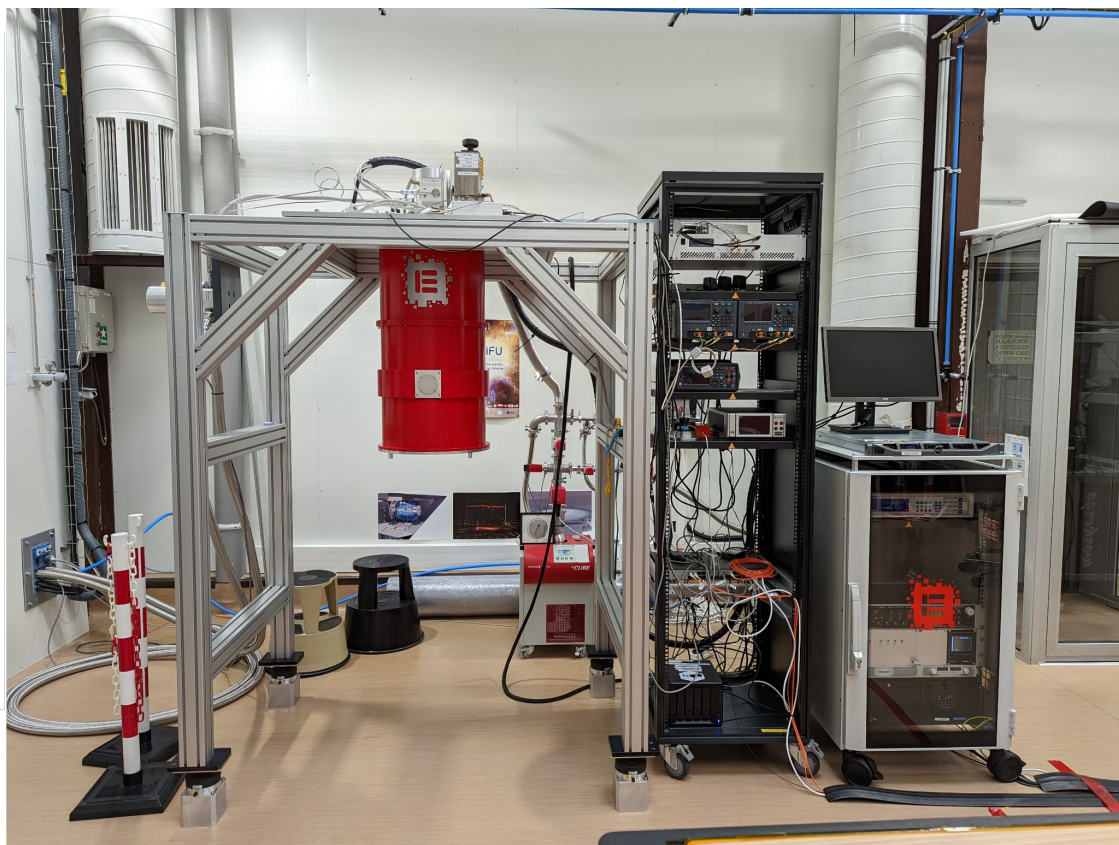
Thesis title: "The study of **instrumental** and **scientific** performances of an IFU on board ATHENA"

1 Instrumental performances of X-IFU

- characterize spectral resolution, cross-talks etc. (*not* calibration)
- validation of detection and **read-out chain** (TES, SQUIDs etc.)
- prototype version of cryogenic test bench developed at Goddard installed at IRAP
aim: validate test bench & progressively incorporate components of X-IFU



Schematic of the cryostat



CNES / IRAP 50mK Test Bench

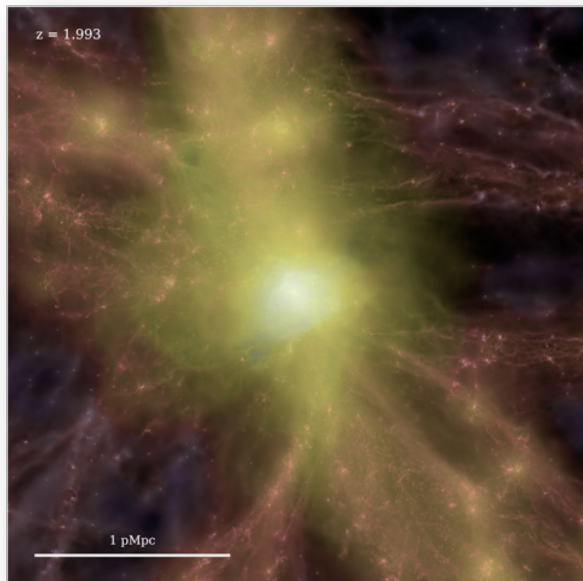
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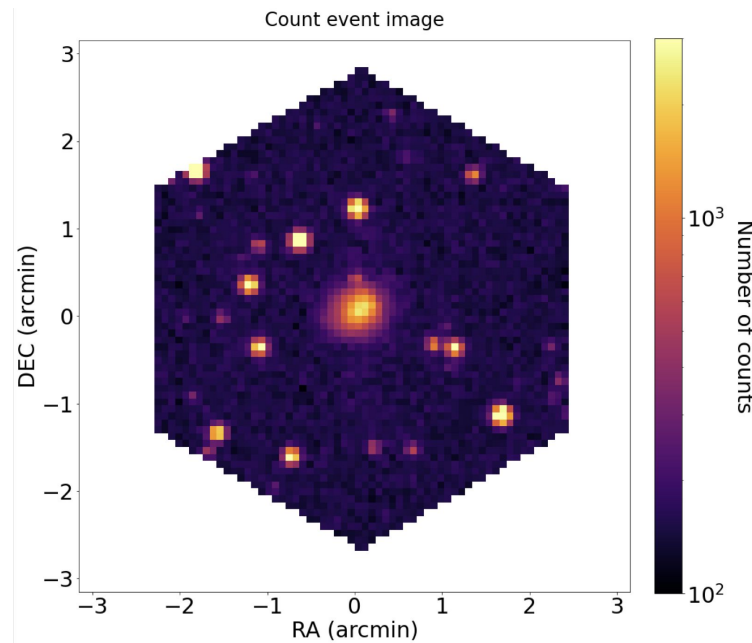
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2 Scientific performances of X-IFU

- use SIXTE to simulate mock observations of groups of galaxies at $z \approx 2$
- ATHENA will be able to produce temperature, density, composition profiles (*not possible with current facilities, e.g., XMM*)



Gas particles visualisation on the selected group of galaxies in cosmological simulations. (Credits: Yannick Bahé / Hydrangea Team)



Mock X-IFU observation of the simulated distant group of galaxies (1Ms exposure time)

Florent Castellani (PhD candidate at IRAP)

... *not* your standard 2nd-year PhD student!

An atypical mixed professional/academic cursus:

- Civil aviation authority technician since 2005
- 2018: remote Master 1 degree in fundamental physics (Aix-Marseille Université)
- 2020: joint Master 2 degree at aeronautics engineering school "SUPAERO" in Toulouse