

**Service d'Astrophysique**  
**SÉMINAIRE**

\*\*\*\*\*

**Mercredi 14 janvier 11h00**

**CEA Saclay, Orme des Merisiers Bât 709, p 220**

**TOWARD UNDERSTANDING OF GRB-SUPERNOVA  
CONNECTION BY GENERAL RELATIVISTIC MHD  
SIMULATIONS**

**Shigehiro Nagataki**

Yukawa Institute for Theoretical Physics, Kyoto University

I would like to present my recent study on collapsars using a General Relativistic MHD (GRMHD) code that I have developed. Also, I have developed a General Relativistic Force-Free (GRFFE) code by which Blandford-Znajek's paraboloidal solution is reproduced. I am going to discuss how important it is to develop a hybrid code that includes GRMHD and GRFFE codes toward understanding the central engine of a long GRB. Further, I have done numerical simulations on collapsars using ZEUS code by adding some microphysics such as a realistic equation of state and neutrino cooling/heating (Nagataki et al. ApJ 2007). If I have enough time, I would like to talk about explosive nucleosynthesis in a collapsar (Nagataki et al. ApJ 2006), which can give a strict constraint on the central engine of a long GRB.

---

Le cafe sera servi 10 minutes avant

Contact : [pascale.chavegrand@cea.fr](mailto:pascale.chavegrand@cea.fr) - Tel : +33 1 69 08 78 27  
[http://irfu.cea.fr/Phocea/Vie\\_des\\_labos/Seminaires/index.php](http://irfu.cea.fr/Phocea/Vie_des_labos/Seminaires/index.php)