J'ai le plaisir de vous informer que je soutiendrai ma thèse le *mardi 26 se**ptembre à 14h00*/. /La soutenance aura lieu à/l'/*UPMC, 4 place Jussieu, tour 24-3**4, salle 509*/*.*/

Un pot sera organisé au même étage après la soutenance.

_T__i__tle:_ Laboratory astrophysics with magnetized laser-produced plasmas/ /

/
Abstract:
/

//We present a theoretical and numerical study of astrophysically-relevant, scaled experiments of laser-produced plasmas in a strong magnetic field. This work is a contribution to the relatively recent field known as high energy density laboratory astrophysics (HEDLA). The basic experimental setup studied involves plasma generated by one or several solid targets embedded in magnetic fields of strengths up to 40 T (0.4 MG), and irradiated with a nano-second laser with intensities up to ~ 1014W cm-2. By changing the relative orientation of the magnetic field and the laser-target, different astrophysical phenomena can be investigated in the laboratory. When the magnetic field is perpendicular, super-Alfvenic jets are seen to emerge from a diamagnetic cavity, which collimates the initially wide-angle expanding plasma flow (v ~ 500 km/s, T ~ 1 MK, n ~ 1018cm-3) through a series of oblique shocks. The resulting jet has a magnetic field topology similar to idealized magnetized accretion columns, and we present a detailed characterization of the dynamics of its impact onto a solid surface mimicking the generation of accretion shocks in TTauri stars. In particular, we show how instabilities, not captured in current models, can modify the dynamics and the envelope of shock-heated plasma that surrounds the accretion column. Finally, when the magnetic field is oriented parallel to the laser-target, the plasma evolves into a thin, unstable slab, whose physics bears striking similarities to magnetically confined slabs studied in solar physics. Alongside the numerical work, we present new experimental results obtained on the ELFIE laser facility in a collaboration with the LULI laboratory.

Bien cordialement,

Benjamin Khiar.