Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Numerical and experimental study of magnetized accretion phenomena in young stars[1] BENJAMIN KHIAR, ANDREA CIARDI, LERMA, Observatoire de Paris, UPMC, ENS, UMR 8112 CNRS, 75252 Paris, France, GUILHEM REVET, TOMMASO VINCI, JULIEN FUCHS, LULI, UMR 7605 CNRS-CEA-cole Polytechnique, 91128, France, SALVATORE ORLANDO, INAF Osservatorio Astronomico di Palermo , 90134 Palermo, Italy, INAF TEAM, LULI TEAM, LERMA TEAM — Newly formed stars accrete mass from the circumstellar disc via magnetized accretion funnels that connect the inner disc regions to the star. The ensuing impact of this free-falling plasma onto the stellar surface generates a strong shock, whose emission is used as a proxy to determine the accretion rates. Observations show that the X-ray luminosity arising from the shock heated plasma at the base of accretion columns is largelybelow the value expected on the basis of optical/UV observations. As a result, current 2D numerical simulations matching X-ray accretion rates cannot reproduce optical accretion rates. To understand the impact of accretion flows on the stellar surface in the presence of a strong magnetic field we have developed laboratory experiments reproducing crucial aspects of the accretion dynamics in Young Stellar Objects. As a model of accretion columns, we use laser-produced super-Alfvenic magnetically confined jets [,4] to collide them on solid targets. Here we present results from these experiments and from multi-dimensional MHD simulations.
[1]$Curranetal.$2011, $A\&A$526, A104
[2]$Orlandoetal.$2010, $A\&A$510, A71
[3]$AlbertazziB., etal., Science$346, 325(2014)
[4]$CiardiA., etal.Phys.Rev.Lett.$110, 025002(2013)

[1]The authors acknowledge the support from the Ile-de-France DIM ACAV, from the LABEX Plas@par and from the ANR grant SILAMPA. Benjamin Khiar
LERMA, Observatoire de Paris, UPMC, ENS, UMR 8112 CNRS, 75252 Paris, France

Date submitted: 21 Jul 2016 Electronic form version 1.4