Quasi Periodic Oscillations in the Pre Phases of Recurrent Jets Highlighting Plasmoids in Current Sheet

Reetika Joshi$^{1,2}$, Ramesh Chandra$^1$, Brigitte Schmieder$^{2,3,4}$, Guillaume Aulanier$^2$, Pooja Devi$^1$, Fernando Moreno-Insertis$^{5,6}$, and Daniel Nóbrega-Siverio$^{7,8}$

$^1$Department of Physics, DSB Campus, Kumaun University, Nainital, 263001, India
$^2$Observatoire de Paris, LESIA, UMR8109 (CNRS), F-92195 Meudon Principal Cedex, France
$^3$Centre for mathematical Plasma Astrophysics, Dept. of Mathematics, KU Leuven, 3001 Leuven, Belgium
$^4$University of Glasgow, Scotland
$^5$Instituto de Astrofísica de Canarias, Via Lactea, s/n, E-38205 La Laguna (Tenerife), Spain
$^6$Department of Astrophysics, Universidad de La Laguna, E-38200 La Laguna (Tenerife), Spain
$^7$Rosseland Centre for Solar Physics, University of Oslo, PO Box 1029 Blindern, NO-0315 Oslo, Norway
$^8$Institute of Theoretical Astrophysics, University of Oslo, PO Box 1029 Blindern, NO-0315 Oslo, Norway

Solar jets observed at the limb are important to determine the location of reconnection sites in the corona. In this study, we investigate six recurrent hot and cool jets occurring in the active region NOAA 12644 as it is crossing the west limb on April 04, 2017. These jets are observed in all the UV/EUV filters of SDO/AIA and in cooler temperature formation lines in IRIS slit jaw images. The jets are initiated at the top of a double chamber vault with cool loops on one side and hot loops on the other side. The existence of such double chamber vaults suggests the presence of emerging flux with cool loops, the hot loops being the reconnected loops similarly as in the models of Moreno-Insertis et al. 2008, 2013 and Nóbrega-Siverio et al. 2016. In the preliminary phase of the main jets, quasi periodic intensity oscillations accompanied by smaller jets are detected in the bright current sheet between the vault and the preexisting magnetic field. Individual kernels and plasmoids are ejected in open field lines along the jets. Plasmoids may launch torsional Alfvén waves and the kernels would be the result of the untwist of the plasmoids in open magnetic field as proposed in the model of Wyper et al. 2016.