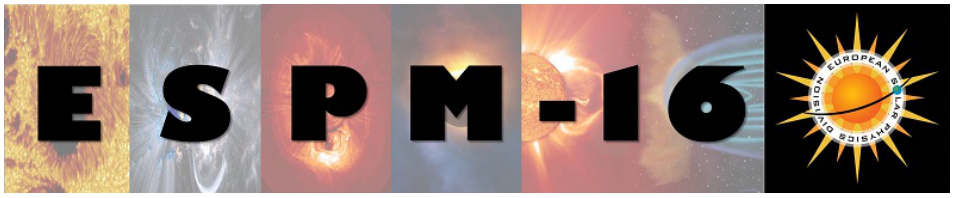


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# Deriving large coronal magnetic loop parameters using LOFAR J-burst observations

*Tuesday, 7 September 2021 09:13 (13 minutes)*

Fast-drift solar radio bursts' exciter velocities have been well studied by analysing type III and type J bursts. These bursts are produced by electron beams travel along open and closed coronal flux tubes. It is thought that electron beams travelling along different magnetic field structures have similar acceleration properties although it has not systematically been tested using radio bursts. By analysing a solar radio noise storm observed by the Low-frequency-array (LOFAR) on the 10th of April 2019, we identified 27 type-III and 27 type-J busts during a solar radio bursts and derived exciter velocities for all identified radio bursts from their frequency draft rates. The comparison shows their speeds are similar, inferring that electron beams experience a similar acceleration process in closed and open flux tubes during the same solar activity event.

We derived the ambient plasma density models that varied along the ascending leg of coronal loops and solar altitude by analysing selected 17 type J bursts. By estimating the density scale height, we inferred physical parameters of large coronal magnetic loops roughly 0.7 to 1.5 solar radii above the photosphere. Coronal loop tops had temperatures around 1.3 MK, pressures around 2.1 dynes/cm^2 and minimum magnetic field strength around 0.22 G. The physical parameters of such large loops are historically ill-defined.

## Student poster?

**Primary author:** ZHANG, Jinge (University College London)

**Co-author:** Dr REID, Hamish (Mullard Space Science Laboratory, UCL)

**Presenter:** ZHANG, Jinge (University College London)

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