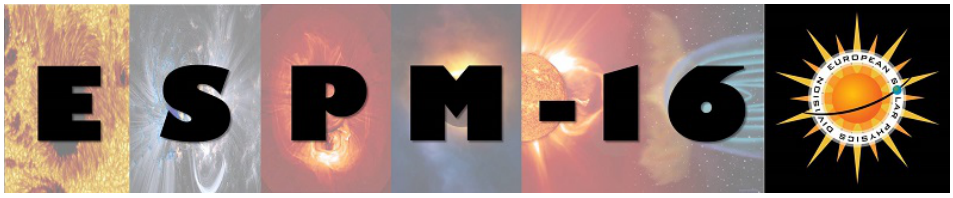

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Bayesian evidence for the nonlinear damping of coronal loop oscillations

Tuesday, 7 September 2021 11:13 (13 minutes)

Recent observational and theoretical studies indicate that the damping of solar coronal loop oscillations depends on the oscillation amplitude. We consider the mechanisms of linear resonant absorption and of nonlinear damping due to the development of the Kelvin-Helmholtz instability. We confront theoretical predictions from these models with observed data in the plane of observables defined by the damping ratio and the oscillation amplitude. The structure of the Bayesian evidence in this plane displays a clear separation between the regions where each model is more plausible relative to the other. There is qualitative agreement between the regions of highest marginal likelihood and Bayes factor for the nonlinear damping model and the arrangement of observed data. A quantitative application to 101 loop oscillation cases observed with SDO/AIA results in the marginal likelihood for nonlinear damping being larger in the majority of them. The cases with conclusive evidence for nonlinear damping outnumber considerably those in favor of linear resonant absorption.

Student poster?

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