

**Observational and numerical studies about frequency chirping of chorus waves in space plasmas**

**Abstract:** The underlying physical mechanism of the nonlinear frequency chirping of whistler mode chorus waves has been investigated for more than fifty years; nevertheless, a consensus has yet to be reached. In this talk, we will present some of our recent observational studies about the dependence of the chorus wave frequency chirping rate on both background plasma parameters and wave amplitude. Comparison with different previously published theoretical models will be given. We will also present numerical simulation demonstrating the amplitude modulation of chorus waves that has also been found in observation. With phase space diagnostics, we suggest that the amplitude modulation is caused by phase space trapping of resonant particles.