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Multipoint measurement of solar wind turbulence anisotropy by Cluster

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We present a study of variance anisotropy, i.e. the anisotropy of magnetic field fluctuations in fast and slow solar wind using high-resolution measurements taken simultaneously at pairs of Cluster spacecraft. The importance of anisotropy is inherently related to the problem of the universality of the scaling properties of MHD turbulence. The anisotropy can be caused by the presence of boundaries and shocks (due to speed differentials and shears) or by a mean magnetic field. Theoretically, away from strongly inhomogeneous boundary layers, homogeneity and isotropy should be restored in a statistical sense. However, recently has been evidenced that the predicted return to isotropy at small scales does not hold in MHD turbulence. Here we incorporate a method based on SO(3) decomposition, in which we disentangle the isotropic and anisotropic contributions to the magnetic field structure function tensor and estimate the degree of anisotropy and the scaling of this tensor at various spatial directions.