

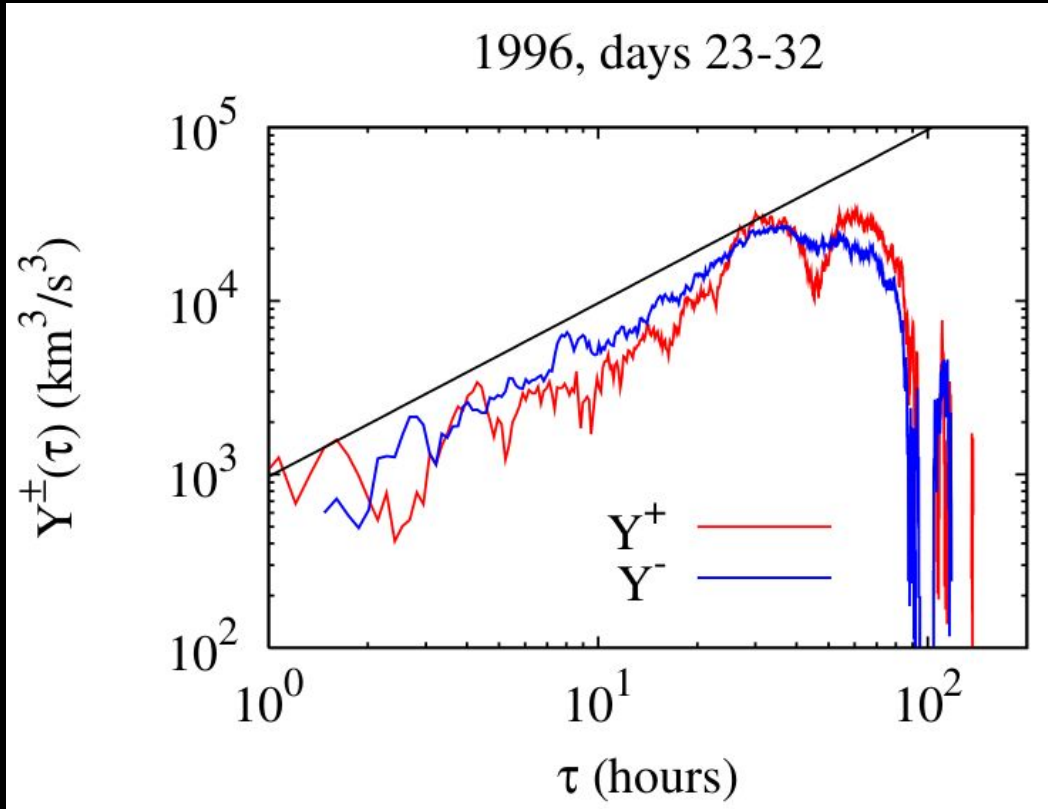
Observation of Inertial-range Energy Cascade within a Reconnection Jet in Earth's Magnetotail

Riddhi Bandyopadhyay

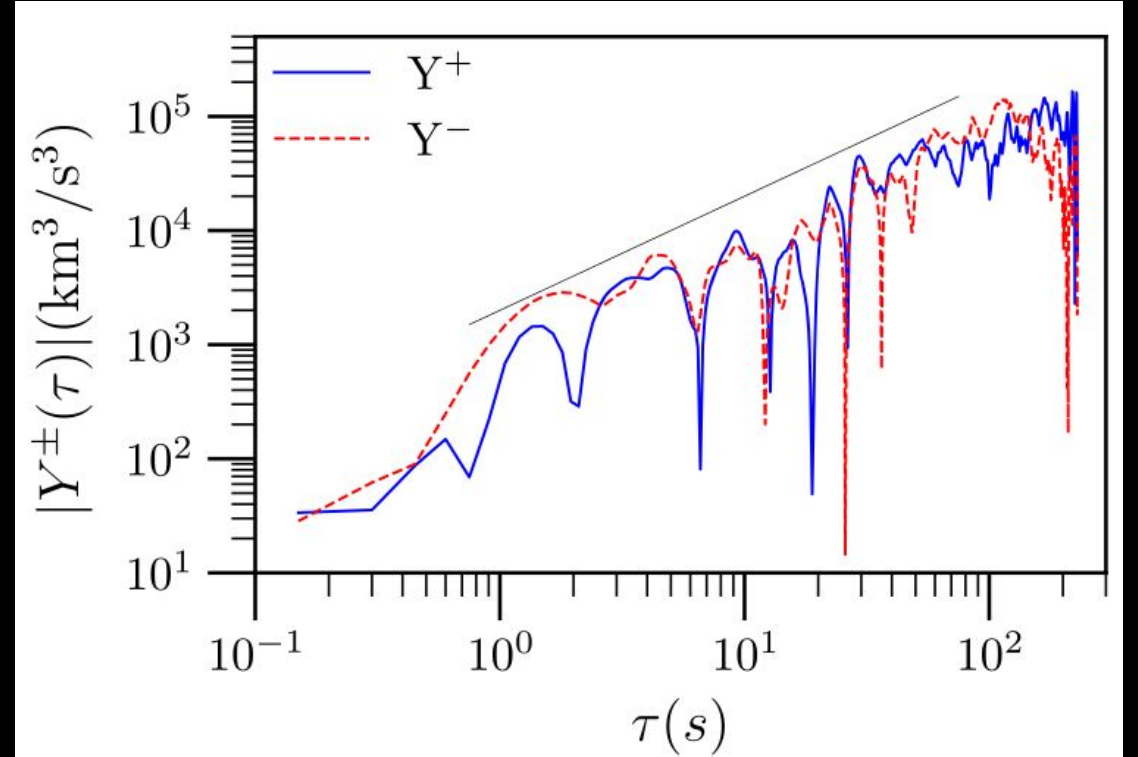
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Wednesday, October 7, 2020

Turbulent Cascade in Space Plasmas



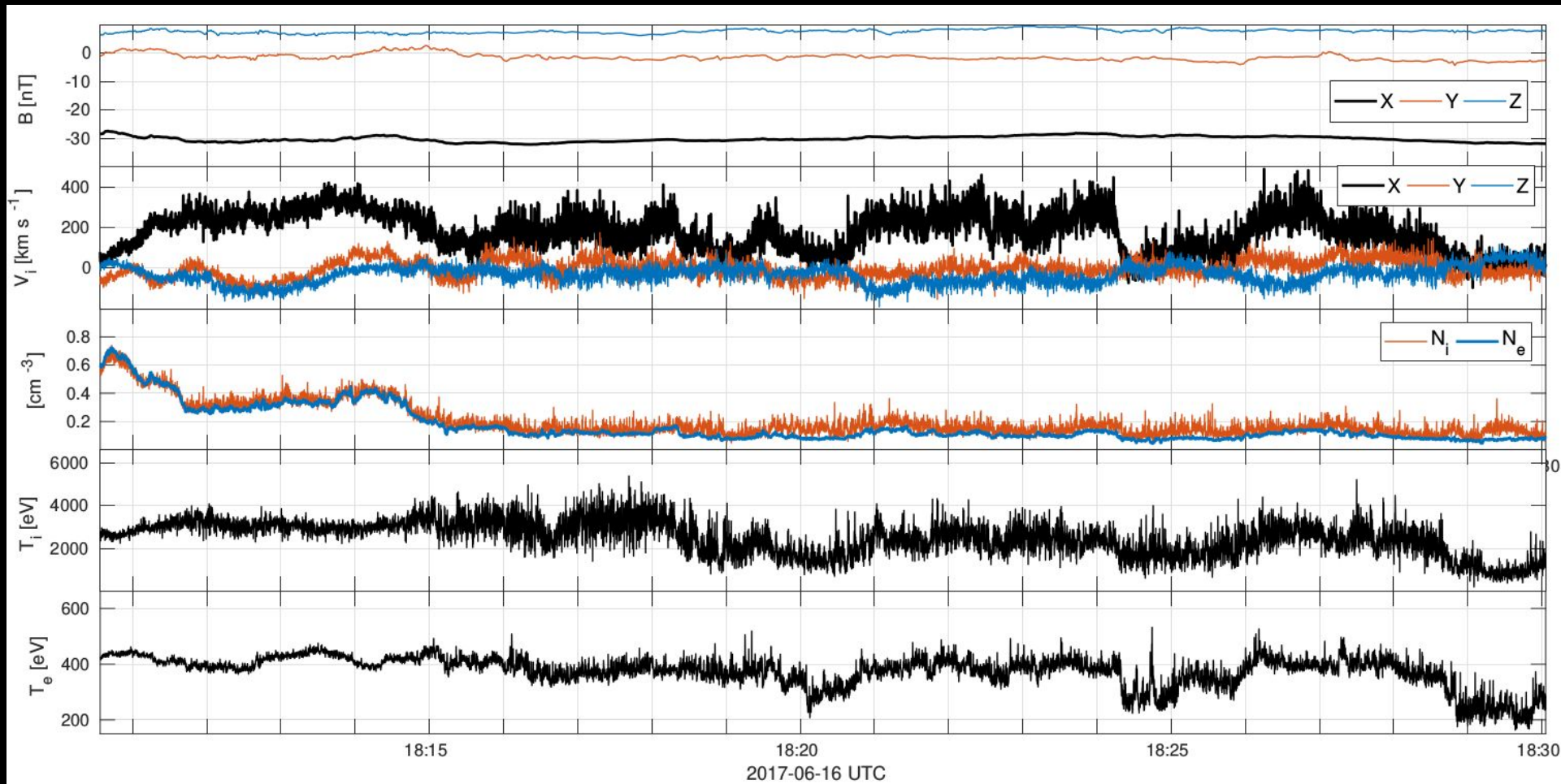
Solar Wind: $\sim 10^3$ W/kg
(e.g., Sorriso-Valvo et al. 2007 PRL)



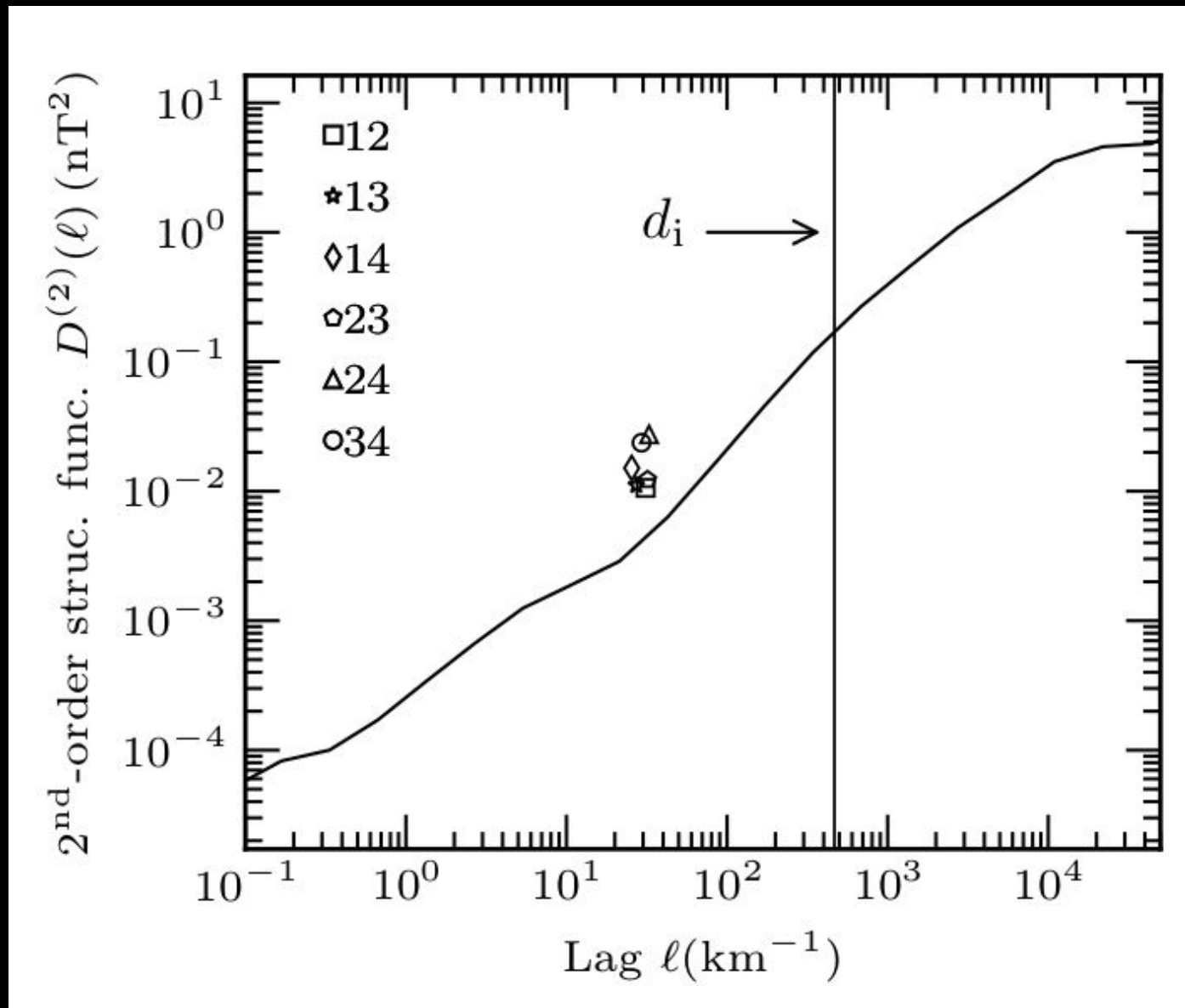
Magnetosheath: $\sim 10^6$ W/kg
(e.g., Bandyopadhyay et al. 2018)

Magnetotail Reconnection Exhaust

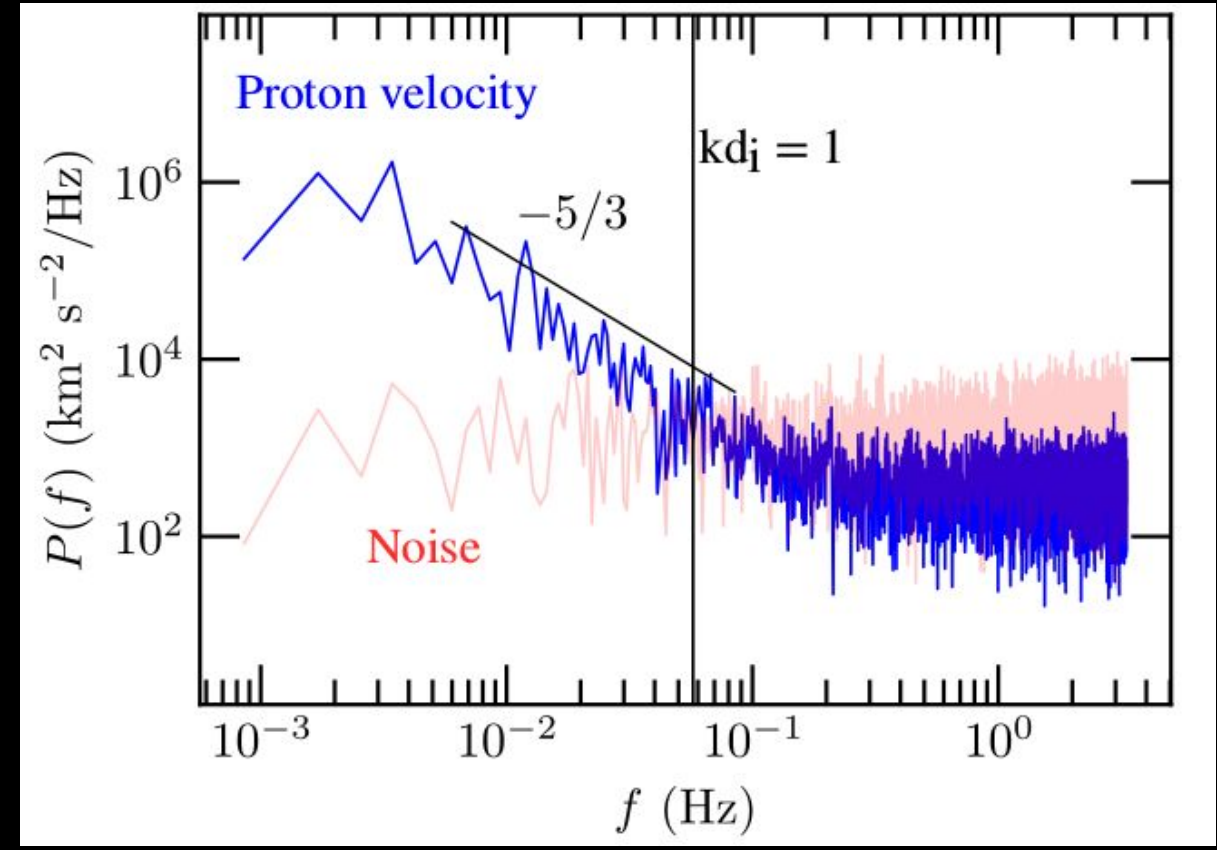
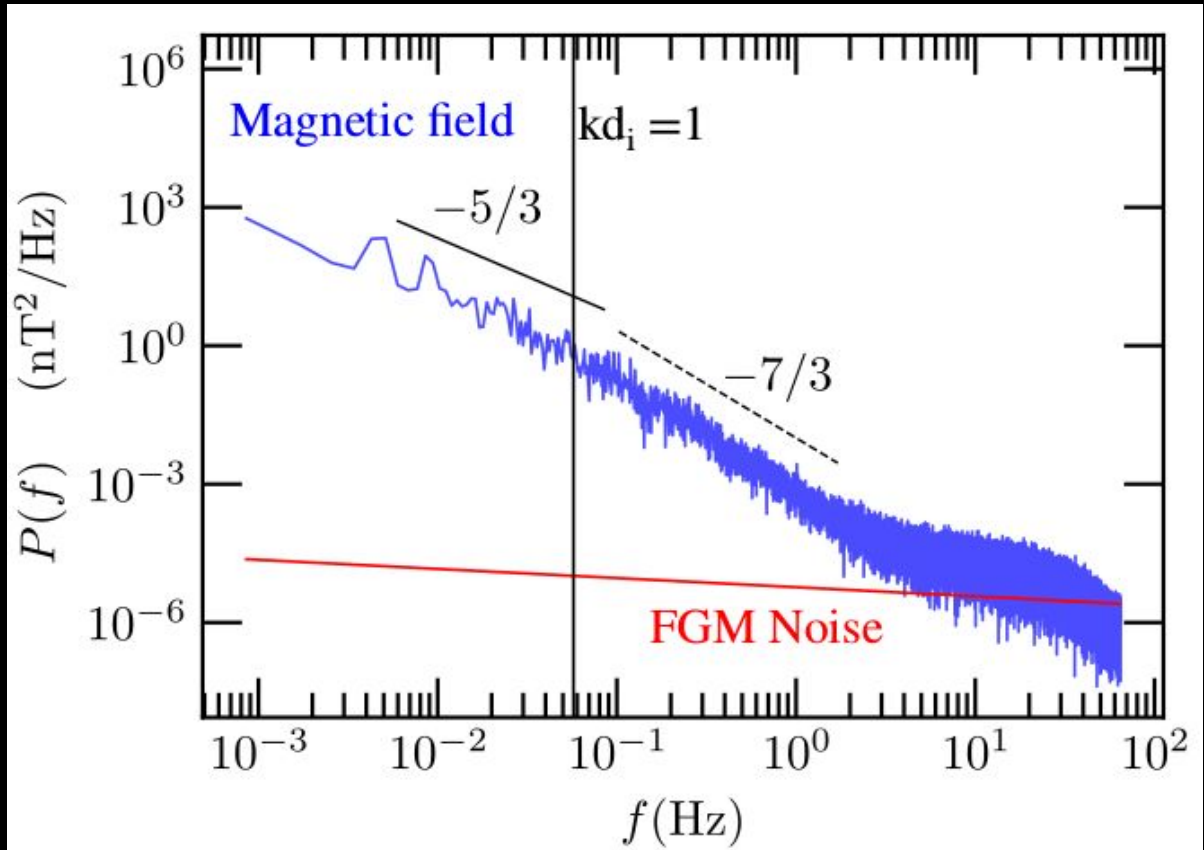
$ \langle \mathbf{B} \rangle $ (nT)	$ \langle \mathbf{V}_A \rangle $ (km/s)	$\frac{B_{rms}}{ \langle \mathbf{B} \rangle }$	$\langle n_i \rangle$ (cm^{-3})	d_i (km)	$ \langle \mathbf{V} \rangle $ (km/s)	V_{rms} (km/s)	β_p
31	1554	0.05	0.22	466	171	100	0.24



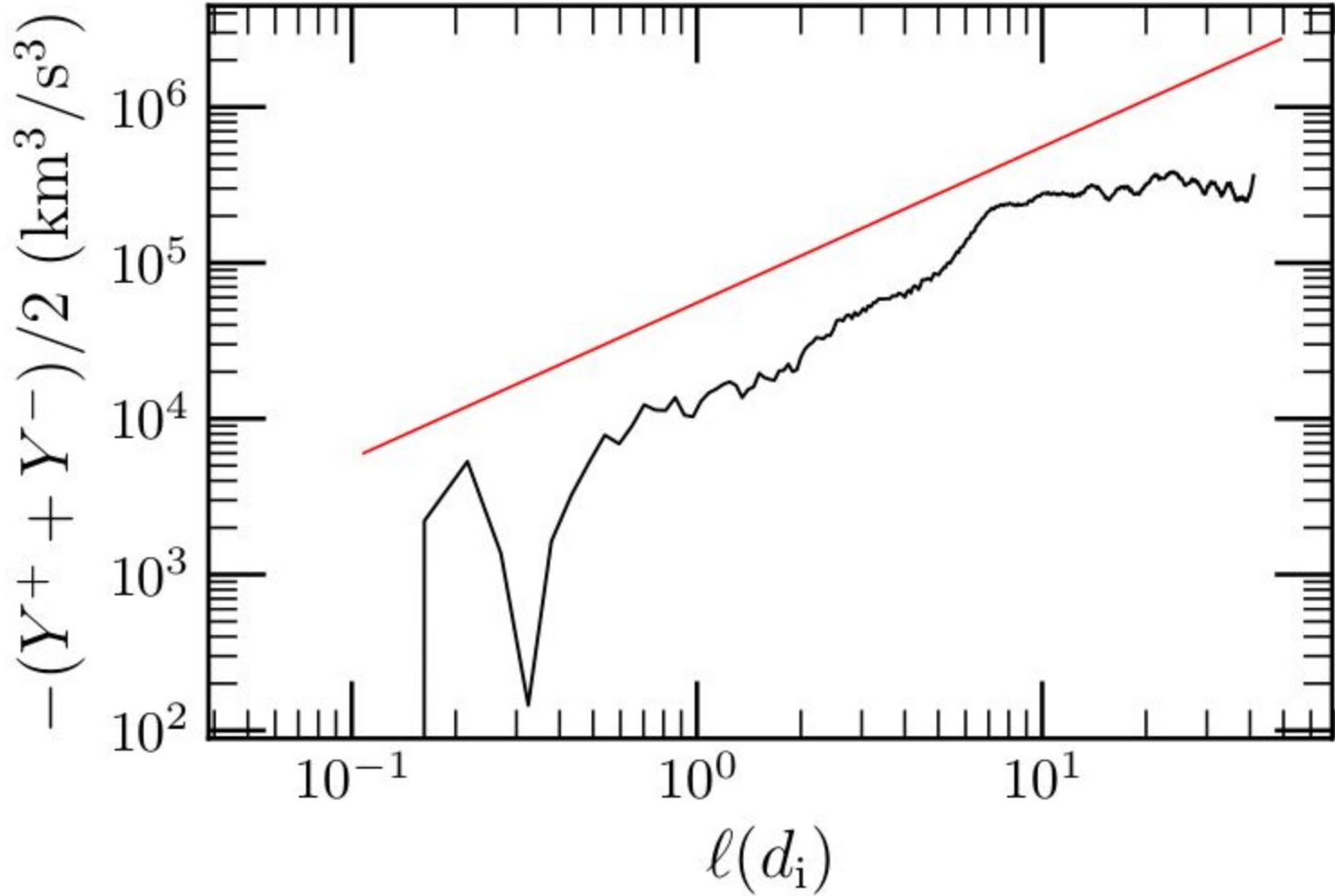
Taylor Hypothesis



Spectra



Cascade Rate



$$\epsilon = (24.2 \pm 0.4) \times 10^6 \text{ J kg}^{-1} \text{ s}^{-1}$$