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Inverse cascades in an experimental turbulent von Kármán swirling flow MIGUEL LOPEZ, JAVIER BURGUETE, UNAV, MHD TEAM —
An experimental study of the energy spectrum in a von Kármán swirling flow is presented. For the experiments we use water stirred in a closed cylindrical cavity placed in a fully developed turbulent regime ($Re \sim 10^5$). The three components of the velocity field (v_R, v_θ, v_z) can be measured with a 1D laser doppler velocimetry, one component at a time. Different time scales can be identified in the fourier space splitting the spectrum in different cascades with different slopes. These timescales are a consequence of instabilities in the mean flow. Two different inverse cascades (slopes -2 and $-1/3$) appear in some regions of the flow whose origin is related to the dynamics of coherent structures. The existence of these times scales can affect the statistical characterization of the turbulent flow.

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