

Anomalous transport of passive particles in Hasegawa-Mima Flows

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Transport properties of particles evolving in a system governed by the Charney-Hasegawa-Mima equation are presented[1]. Transport is found to be anomalous. All characteristic transport exponents have a similar value around $\mu = 1.75$, which is also the one found for simple point vortex flows in the literature[2], indicating some kind of universality. This phenomenon is related to the existence of long-time correlations which are traced back to the presence of chaotic jets within the flow. The localization of a jet is performed, and its structure is analyzed. It is clearly shown that despite a regular coarse grained picture of the jet giving rise to anomalous transport, the motion within the jet is chaotic.

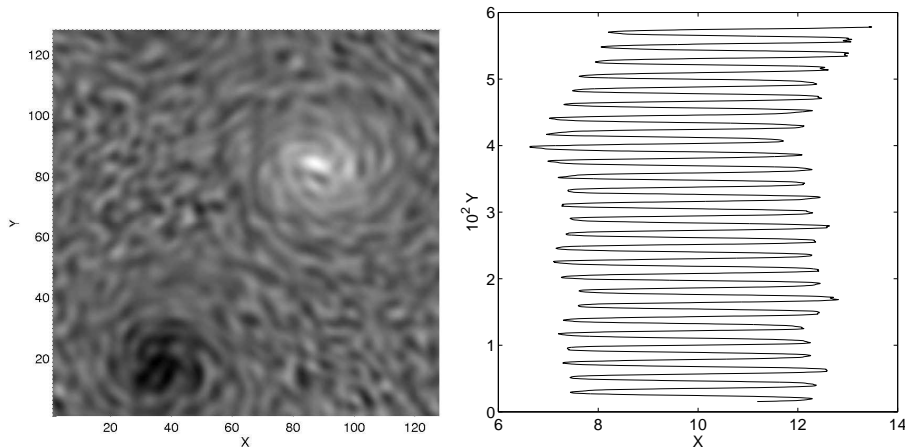


Figure 1: Left: Visualisation of a forced field Figure in a stationnary regime. Localization of a jet bouncing back and forth between the two structures.

References

- [1] X. Leoncini, O. Agullo, S. Benkadda and G. M. Zaslavsky nlin.CD/0411054, submitted to Phys. Rev. E
- [2] X. Leoncini and G. M. Zaslavsky nlin.CD/0209029, Phys. Rev. E, 65 046216 (2002)