

Theoretical and Numerical Studies of Turbulence in Fluids

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This project brings together the expertise of several scientists in Nice and Paris, in France, and two scientists and their groups in Bangalore, India, to study a variety of problems in the statistical characterization of turbulence in fluids. The Indian Principal Collaborator's group at the Indian Institute of Science (IISc) in Bangalore has been collaborating extensively with the group of Professor Uriel Frisch at the Observatoire de la Cote d'Azur (OCA) in Nice for more than a decade; this collaboration has grown to include the scientists from OCA, Nice, the University of Nice (UNice), and the Ecole Normale Supérieure (ENS) in Paris; these scientists are listed here and include the French Principal Collaborator. Three students, Debarghya Banerjee, Anupam Gupta, and Vishwanath Shukla, from the IISc group, are already working on some of the problems mentioned in the proposal below. Samriddhi Sankar Ray, who was, until recently, a postdoctoral fellow at the Observatoire de la Cote D'Azur in Nice, has just joined the faculty of the ICTS-TIFR in Bangalore. He has been part of this collaborative research programme for several years and he will also take part in this project as a Joint Collaborator on the Indian side. We propose to study a variety of problems in turbulence. These can be classified into three parts that are devoted, respectively, to (I) superfluid turbulence, (II) the use of high-precision calculations and asymptotic-extrapolation methods in turbulence in a variety of hydrodynamical equations, and (III) fluid turbulence with polymer additives and with particles in turbulent flows.

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