1165-45-263 **Jaan Kalda*** (kalda@ioc.ee). *Fractional diffusion emerging from two-dimensional advection.*

Fractional diffusion can be used to describe the transport of tracers by two-dimensional incompressible advection at the limit of large Peclet numbers, i.e. when the seed diffusivity of the tracer particles is much smaller then the magnitude of the stream function of the advection field. If the advection field is stationary, the eddies — regions with short streamlines — play a role of traps so that the tracer particles will perform a continuous time random walk along a sparse set of very long streamlines. Such an advective transport is relevant, among other applications, to the transport of particles and magnetic fields in mangetized plasmas. The fractional order of derivatives needed to describe such an advection depends on the statistical topography of the streamfunction; in the case of random functions obeying a single characteristic scale, the fractional order of derivatives is expressed in terms of the critical exponents of the percolation problem. (Received January 19, 2021)