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Effects of Turbulence on Cosmic Ray Propagation in Protostar Systems DONOVAN HERBERT, MARCO FATUZZO, Xavier University, FRED ADAMS, University of Michigan — The magnetic field associated with young stellar objects are expected to have an hour-glass geometry, i.e. the magnetic field lines are pinched together in the equatorial plane surrounding the forming star but are subsumed smoothly onto a background field at large distances. In such a structure, incoming cosmic rays experience both a funneling effect, which acts to magnify the flux impinging on the circumstellar disk, and a magnetic mirroring effect that acts to reduce that flux. These effects nearly cancel out for simple underlying magnetic field structures with respect to the leading order. However, the environments surrounding young stellar objects are expected to be highly turbulent and, thus, act to complicate these effects. We consider here how the presence of magnetic field fluctuations affects the process of magnetic mirroring, and thereby changes the flux of cosmic rays striking the circumstellar disks. These results may have significant consequences for the ionization fraction of the disk, which in turn dictates the efficiency with which disk material can accrete onto the central object.

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