

DISCOVERY OF THE VORTEX FLOWS PREDICTED BY THE MODELS OF SOLAR CONVECTION

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We have discovered small whirlpools in the Sun, with a size ~ 0.5 Mm. The theory of solar convection predicts them, but they had remained elusive so far. The vortex flows are created at the downdrafts where the plasma returns to the solar interior after cooling down, and we detect them because some magnetic bright points (BPs) follow a logarithmic spiral in their way to be engulfed by a downdraft. Our disk center observations show 0.9×10^{-2} vortexes Mm^2 , with a lifetime of the order of 5 min, and with no preferred sense of rotation. They are not evenly spread out over the surface, but they seem to trace the supergranulation and the mesogranulation. These observed properties are strongly biased by our type of measurement, unable to detect vortexes except when they are engulfing magnetic BPs. If time allows for, we will speculate on how the vortical motions of magnetic concentration trapped in vortexes can transport energy outward to be dissipated in the external solar atmosphere. Reference: Bonet et al. (2008, ApJ, 687, L131).

Sun: convection. Sun: atmosphere

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