MEASUREMENTS OF MAGNETIC FIELD STRENGTHS IN MOLECULAR CORES

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The Zeeman effect in 18cm spectral lines of OH (1665 and 1667 MHz) provides information about magnetic field strengths in molecular clouds. We have used the 300m Arecibo telescope for an extensive survey of the Zeeman effect in OH emission lines from nearby dark cloud cores. These data reveal the line-of sight field strengths or upper limits thereto. Magnetic field strengths, together with measurements of the column densities, can be used to estimate the mass-to-flux ratios in the cores. In general, we find this ratio (with respect to the critical value for which gravity and magnetic support are in balance) is of order unity. We find no cases where it is significantly less than unity as predicted by ambipolar diffusion models of core evolution. We conclude that magnetic fields play an important role in molecular core evolution but perhaps not a decisive role.