MOLECULAR CLOUD MAGNETIC FIELD OBSERVATIONS VIA LINEARLY POLARIZED SPECTRAL LINES

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Observations of magnetic field strengths and morphologies in molecular clouds can test theories of what drives the star formation process. A new observational technique, first proposed by Goldreich, involves the observation of linear polarization of millimeter-wave molecular lines. The direction and an estimate of the strength of the magnetic field projected onto the sky may be inferred by mapping a cloud. The technique opens new environments to measurements of magnetic fields, such as molecular outflows from young stellar objects. In addition, information about the field structure as a function of radial velocity may be obtained. I briefly review the physics that produces the linear polarization, report application of this technique to molecular clouds by observations of CO lines with the BIMA millimeter-wave array, and discuss the astrophysical significance of the results.