

K07a 重力波の円偏向観測によって探る超新星爆発の物理

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We propose to employ the circular polarization of gravitational waves emitted by core-collapse supernovae as an unequivocal indication of rapid rotation deep in their cores just prior to collapse. It has been demonstrated by three dimensional simulations that nonaxisymmetric accretion flows may develop spontaneously via hydrodynamical instabilities in the postbounce cores. It is not surprising, then, that the gravitational waves emitted by such fluid motions are circularly polarized. We show, in this Letter, that a network of the second generation detectors of gravitational waves worldwide may be able to detect such polarizations up to the opposite side of the Galaxy as long as the rotation period of the core is shorter than a few seconds prior to collapse.