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Two-Dimensional Simulations of Core-Collapse Supernovae: The Role of Anisotropic Neutrino Radiation HIDEKI MADOKORO, RIKEN — We have carried out two-dimensional numerical simulations of core-collapse supernovae. Special attention was paid to the role of anisotropic neutrino radiation on the explosion dynamics. It was revealed (Shimizu et al. 2001, Astrophys. J. 552, 756; Madokoro et al. 2003, Astrophys. J. 592,1035; Madokoro et al. 2004, Publ. Astron. Soc. Japan 56, 663) that a small amount of anisotropy in the neutrino flux can increase explosion energies to a large extent when total neutrino luminosity was fixed and the profile of the neutrino flux was assumed. In the previous talk, we showed our first results starting from the onset of core-collapse. It was confirmed that collapse, bounce and shock formation were correctly reproduced in our simulations. Neutrino heating and cooling were, however, omitted due to difficulty of treating neutrino transport in multi-dimensional calculations. In this talk, our new results are shown in which the effects of neutrino heating and cooling are approximately included. Especially we will discuss the origin of anisotropic neutrino radiation, the degree of anisotropy, and the effects of anisotropic neutrino emission on the explosion mechanism.

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