The radiation-hydrodynamic simulation of SN2009ip

Urvachev E M[@], Blinnikov S I and Glazyrin S I

Dukhov Research Institute of Automatics (VNIIA), Sushchevskaya 22, Moscow 127055, Russia

[@] EMUrvachev@vniia.ru

The Dense Shell Method (DSM) [1] is one of the direct methods for determining cosmological distances. It does not require calibration, usually carried out using objects in the local Universe, which is why this method can be applied at high redshifts. The DSM has been successfully applied to determine the distance to the supernova SN2009ip as well [2]. According to one of the most probable scenarios, the SN2009ip luminosity can be explained by the interaction of a strong shock wave on a dense circumstellar medium. This report presents the results of SN2009ip simulation using multidimensional radiation-hydrodynamic code, FRONT [3]. The dynamics of the dense shell that was used in the DSM and determines the supernova luminosity was obtained. The correctness of using DSM is also discussed.

[1] Blinnikov S, Potashov M, Baklanov P and Dolgov A 2012 *JETP letters* **96** 153–157

[2] Potashov M, Blinnikov S, Baklanov P and Dolgov A 2013 *Monthly Notices of the Royal Astronomical Society: Letters* **431** L98–L101

[3] Urvachev E, Shidlovski D, Tominaga N, Glazyrin S and Blinnikov S 2021 *The Astrophysical Journal Supplement Series* **256** 8