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Nucleosynthesis in asymmetric supernovae explosion

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The problem of nucleosynthesis is studied within an aspherical supernova explosion model. The detailed yield of the chemical elements was performed as postprocessing step by a tracer particles method. The produced nuclides formed two large-scaled layer-structured bubbles with the sizes comparative to the radius of a stellar core, moving from the center in opposite directions. Each layer contained a particular type of nuclides. The iron- group elements (56Ni) were moving preferentially along the cylindrical axis inside the hot region between the forward and reverse shockwaves. The light elements (12C, 16O, 20Ne, 24Mg) formed a torus-like structure in the equatorial plane. The obtained geometry and chemical composition is consistent with theoretically predicted shock breakout phenomenon and is indirectly supported by some SNe observations.

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