

Abstract Submitted
for the 4CF09 Meeting of
The American Physical Society

Can a Planetary System Survive a Host Star Supernova Explosion? ALEXANDER PANIN, JUSTIN GIOVANNONI, Utah Valley University — The recent search for extrasolar planets has brought a surprising discovery – almost any star seems to have a planetary system around it. We know that massive stars end their lives in a violent supernova explosion, during which extremely large amount of energy ($3 \times 10^{46} \text{J}$) is released by the star in a very short time. Can a planetary system survive such a violent event? Can a planet survive? Can planetary biosphere survive? In the current presentation we analyze, based on known physics, the effect of a supernova explosion on a planet orbiting such a star in its habitable zone. Our calculations show that even a small Earth-like planet is not destroyed mechanically nor thermally in such an explosion (and larger planets are even more stable). Nor is a planet kicked out of its orbit due to the momentum of exploding star shell or of due to star's radiation pressure. In some cases even a portion of a planetary biosphere (deep in planet's crust) can survive. However, if a star loses too much mass, a planet would leave. Also, if star's collapse is asymmetric then the star itself can leave the planetary system. The sequence of events during supernova explosion and how they influence such a planet is discussed in the presentation.

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Date submitted: 28 Sep 2009

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