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A first sign from the neutron star in SN 1987A

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After three decades, the neutron star formed by SN 1987A has likely given us a first sign of its presence: a blob of warm dust near the center of the explosion. I will summarize our understanding of the explosion, the structure of the supernova remnant, and the characteristics of “the blob”. I will describe in detail the possible explanations for the excess of energy coming out of the blob: radioactive heating, accretion onto a black hole or energy output from a neutron star. In the latter case, it could be either accretion energy, the power output from a pulsar or simply the thermal radiation from a hot young star. Our study strongly favors thermal radiation, but the alternatives cannot be totally ruled out. An important consequence of this is that this young neutron star is definitely not an energetic pulsar and more likely a new member of the growing family of Central Compact Objects (CCOs) that constitute about 25% of the young neutron star population and show no signs of pulsar activity.

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