Shocking start for the solar system

In the 1970s, the hypothesis arose that our solar system was formed by a passing shock wave from a supernova, which triggered the collapse of an interstellar cloud into a dense region of gas and dust that further contracted to become the Sun and its orbiting planets. The original evidence came from very old meteorites that contained magnesium-26, a daughter product of the short-lived radioactive isotope (SLRI) aluminum-26—produced in stellar nucleosynthesis. Further evidence came from another SLRI, nickel-60, which can only be produced in a supernova's furnace. In astronomical terms, short-lived means a half-life of about a million years; any SLRIs would have been transported to, and dropped off in, the pre-solar cloud faster than that time scale. Computer modelers from the late 1990s, however, could not produce both the collapse and the injection of supernova material unless they artificially prevented the shock wave from heating the cloud. That situation has now been remedied by a group from the Carnegie Institution of Washington, who used a modern, adaptive-grid computer code with an improved treatment of heating and cooling. Their new models show that a supernova's shock wave moving into an otherwise stable solar-mass cloud can both trigger the collapse and leave behind enriched gas and dust, including the SLRIs whose products are found in meteorites. Furthermore, the researchers found that a protostar began to form in less than 200 000 years, in the blink of an astronomical eye. (A. P. Boss et al., *Astrophys. J. Lett*. **686**, L119, 2008.) —Stephen G. Benka