Astronomy 101: Week #13 Handout, 2006.04.11
San Diego State University, Prof. Leonard

Reading Assignment for Tuesday, April 18

This week we pick up where we left off last Tuesday, by discussing the final, often dramatic, stages of stellar evolution for the most massive stars.

- *Voyages Through the Universe*, Chapter 22: Sections 22.2.4, 22.3, 22.4, and 22.5.

  We continue our reading here about supernovae by discussing some interesting consequences of these stellar explosions, including the production of elements heavier than iron (e.g., gold, platinum, etc.) and high-energy cosmic rays: atomic nuclei – mostly protons – that are observed to strike the Earth’s atmosphere with exceedingly high energies; you may read more about these particles in Ch. 19.4, although you are not required to do so. The chapter then continues on with a discussion of the closest supernova observed by humans since the time of Kepler, SN 1987A. Pay particular attention to the section on the detection of neutrinos from this event, as it confirmed our basic theory of core-collapse in massive stars. Section 22.4 describes the compact remnant that often remains after the core-collapse of a massive star, a neutron star. Finally, section 22.5 discusses the evolution of binary stars, and includes a potential channel through which even a low-mass star may end its life as a “Type Ia” supernova. (Supernovae resulting from massive stars are called “Type II” events.)

- On-Line Material: Chapter 22 – Take the Post-Test. This contains the material from last week’s reading as well. Most of the questions are quite good, and are similar to what you might expect on an exam. The only questions on material that we did cover that I do not like are Questions 10 (it is hotly debated exactly how a star explodes; perhaps the question should have been phrased as: “…what is the most commonly accepted view as to what produces the outward push…”), and 12 (we don’t really know why we haven’t seen a Galactic SN since 1604; most likely it is due to dust obscuration, but we don’t know this for sure).

Writing Assignment for Tuesday, April 18

Please answer the following question. This assignment will be collected on May 4, when the 4th and final homework collection will take place.

1. Chapter 22, Thought Question #12, on p. 509 of the text. Be sure to completely explain the reasoning behind your answer.

(Supernova SN 1987A makes the cover of *Time.*)