Stellar Structure & Evolution

Problem Set 4

Due November 24, 2014

Calculate the flux of neutrinos, to order of magnitude accuracy, (and express the rate in SNU), expected from

1) A 1 Gigawatt nuclear reactor at a distance of 1,000 km
2) Alpha Centauri A
3) Sirius A
4) Sirius B
5) An erupting classical nova at a distance of 100 parsecs
6) Betelgeuse
7) Gamma Velorum
8) A pair of merging white dwarfs with total mass = 2 Msun at the Galactic Center
9) The merger of two supermassive black holes with 10^8 Msun each at z = 1.0

Describe the technology, and estimate the size and cost of a detector to detect 1), 2), 7) and 8) above.