Progenitor Star

6×10^8 km

Iron Core

6×10^3 km

Collapse of Core
(~ 1.5 M$_\odot$)

Early Supernova

2×10^3 km

30,000–60,000 km/s   Bounce Shock

ν-SPHERE

Hot, extended mantle

2×10^2 km

DENSE CORE

Early Protoneutron Star
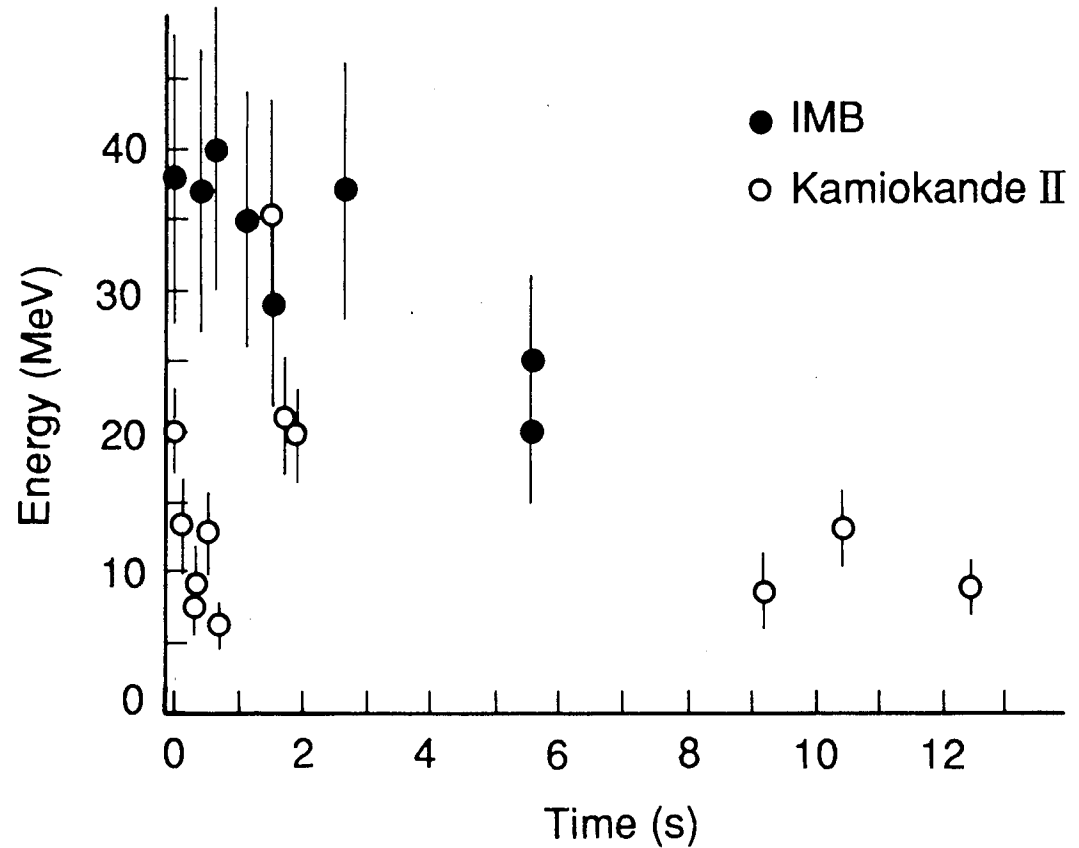
30 km   DENSE CORE

Late Protoneutron Star

February 1984   March 8,1987

A supernova
converts
~ 1 M$_\odot$ to ν

$$\left|\Delta t\right| = \frac{1}{2} L m_v^2 \frac{\left|E_1^2 - E_2^2\right|}{E_1^2 E_2^2}$$

Limit from SN1987a is $m_{\nu_e} > 23$ eV (PDG)

Best you can do is ~5-10 eV, which isn't good enough