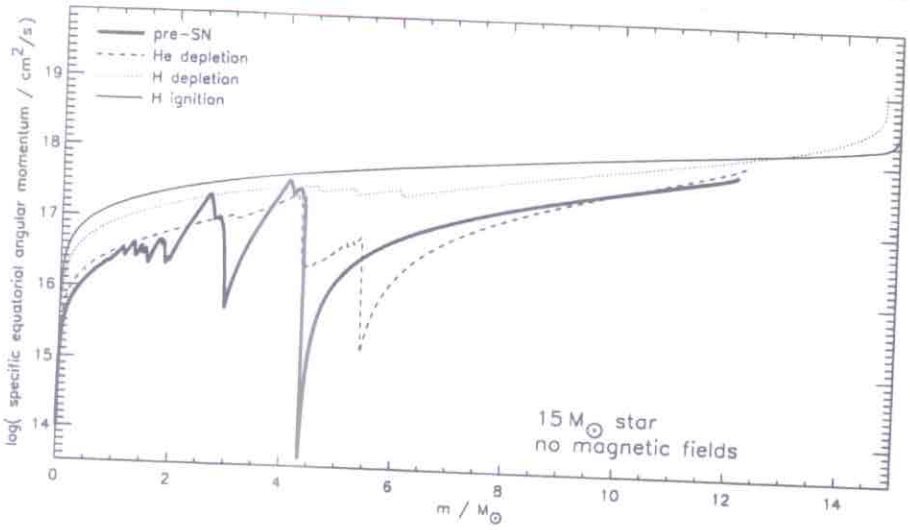

Figure 1. Specific angular momentum, j, as a function of mass coordinate, m at different evolution stages in $15\,M_\odot$ star rotating with $200\,km\,s^{-1}$ on the zero-age main sequence (ZAMS; hydrogen ignition). The *thin sold line* gives j on the ZAMS at which the star is essentially in rigid rotation. The *dotted line* gives the angular momentum at central hydrogen depletion (1 % hydrogen left), the *dashed line* at central helium depletion (1 % helium left), and the *thick solid line* the distribution at onset of core collapse. The lines of later evolution stages end at lower mass coordinate because of mass loss due to stellar winds.

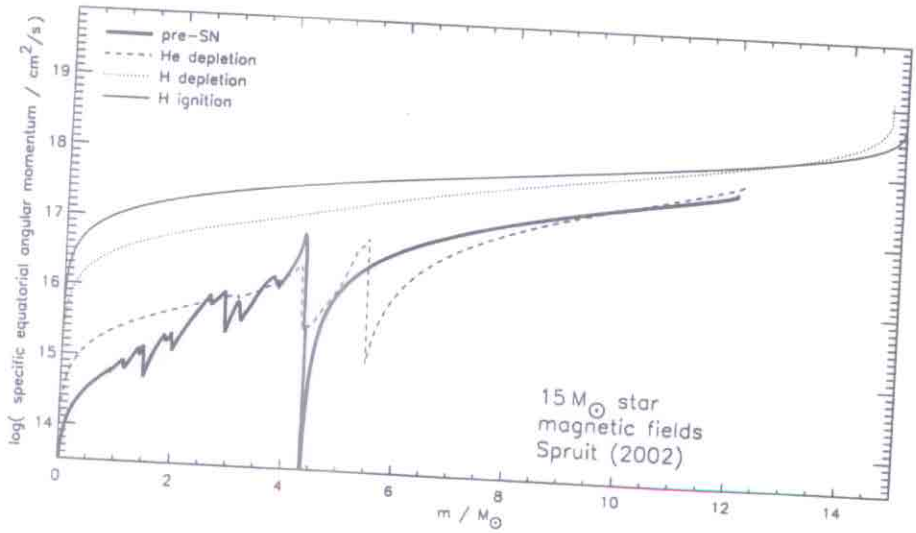

Figure 2. Similar to Figure 1, but for a star that includes magnetic torques according to Spruit (2002, 2003).

Table 5. Pulsar rotation and angular momentum for different masses. We assume initial solar composition and a ZAMS equatorial surface rotation rate of $200\,km\,s^{-1}$. In the 2^{nd} column we give the total angular momentum in the inner $1.7\,M_\odot$ of the stellar core. Assuming no further loss of angular momentum and that a neutron star with moment of inertia $I = 1.44 \times 10^{45}\,g\,cm^2$ is formed ($R = 12\,km$, $M = 1.4\,M_\odot$, $I = 0.36MR^2$; Lattimer & Prakash 2001) the resulting (lower limits for the) pulsar periods are given in the 3^{rd} column.

stellar mass	J (erg s)	period (ms)
$15\,M_\odot$	1.4×10^{48}	6.7
$20\,M_\odot$	1.8×10^{48}	5.0
$25\,M_\odot$	2.1×10^{48}	4.3

- from Heger, Woosley, Langer & Spruit IAU Symp. 215, 2004 (Maeder, editor)
- see also: Heger, Woosley, Spruit, 2005, ApJ.

with Spruit's magn. coupling J_{core} is 30 - 50 times smaller at collapse