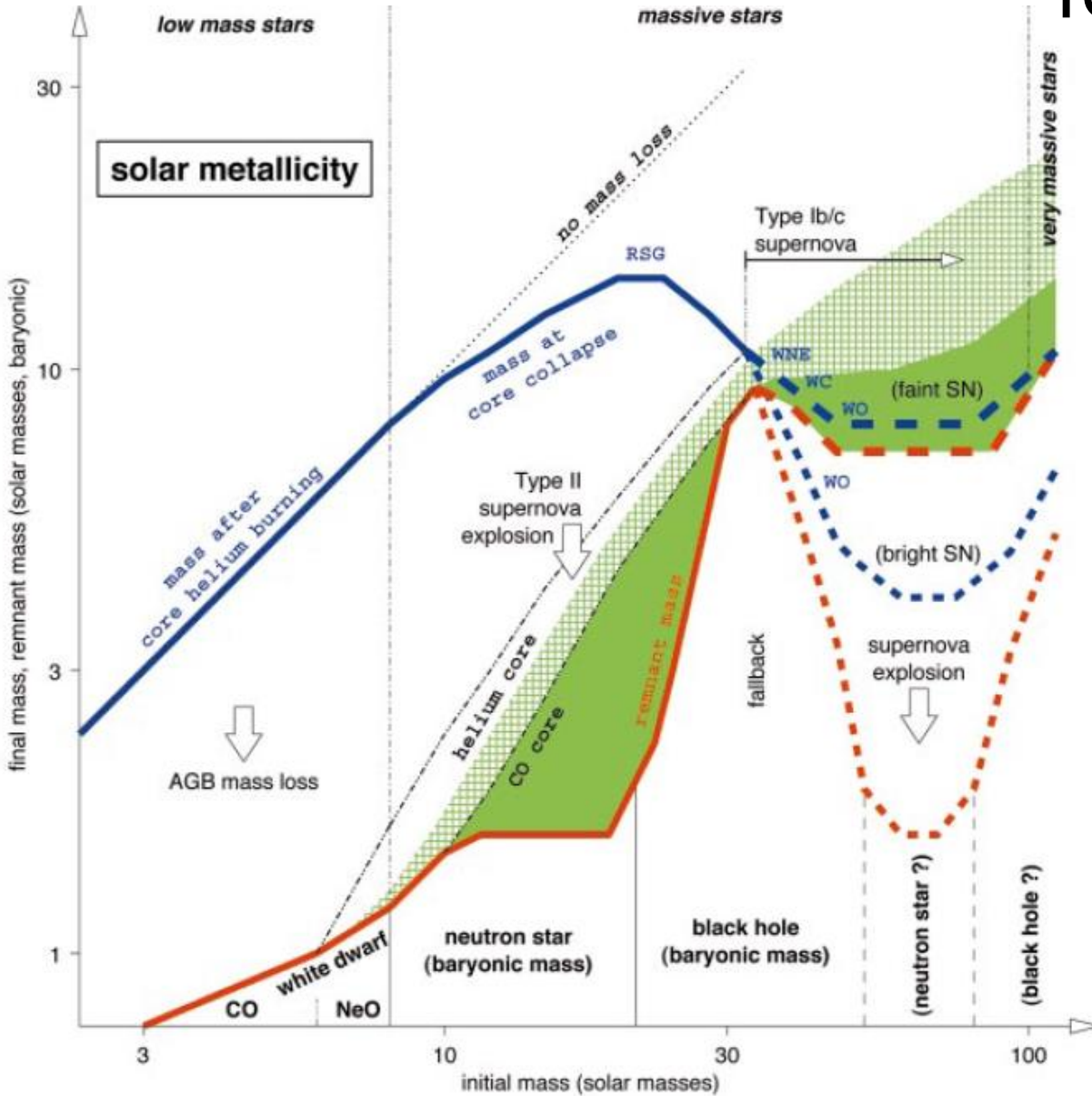


BH/NS

Tomoya Takiwaki

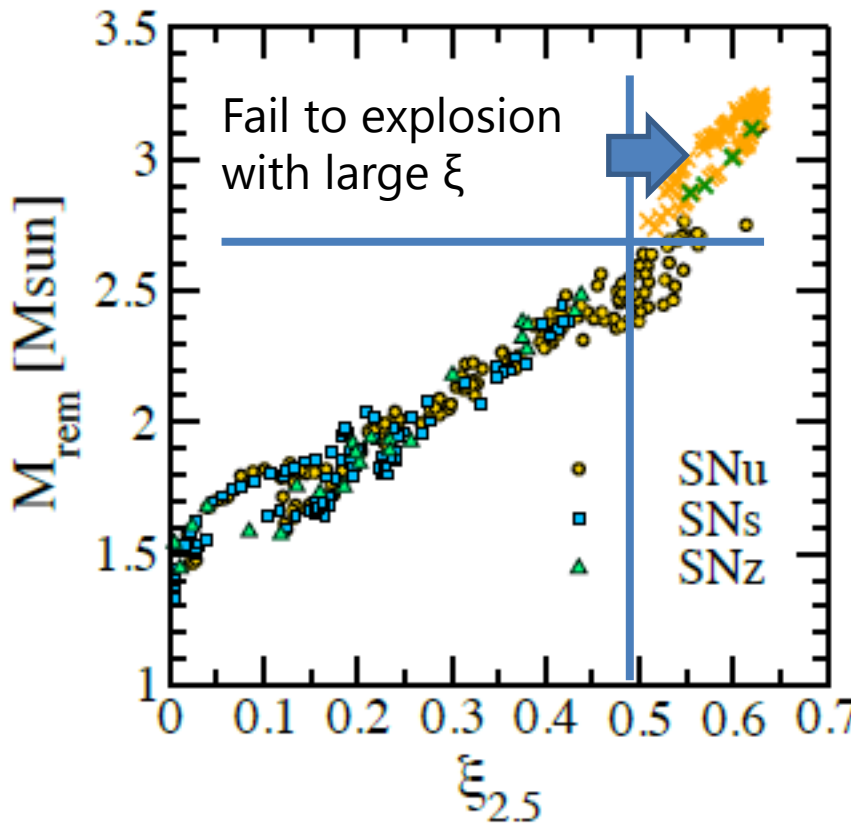
This is only expectation
Not based on the rigid evidence



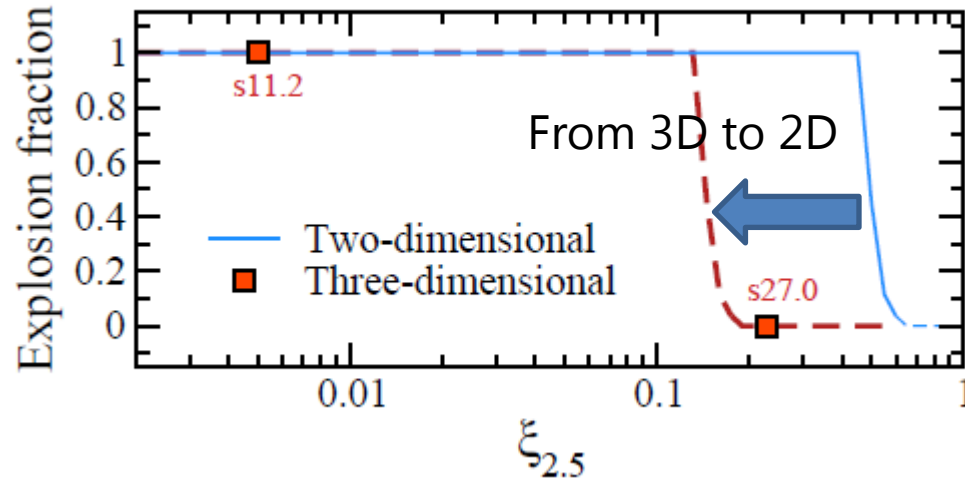
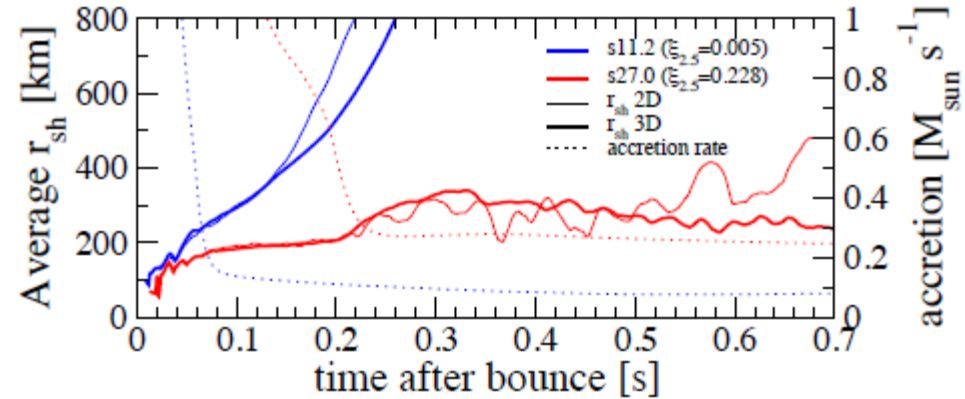
Heger et al 2002.

Compactness determine the fate!

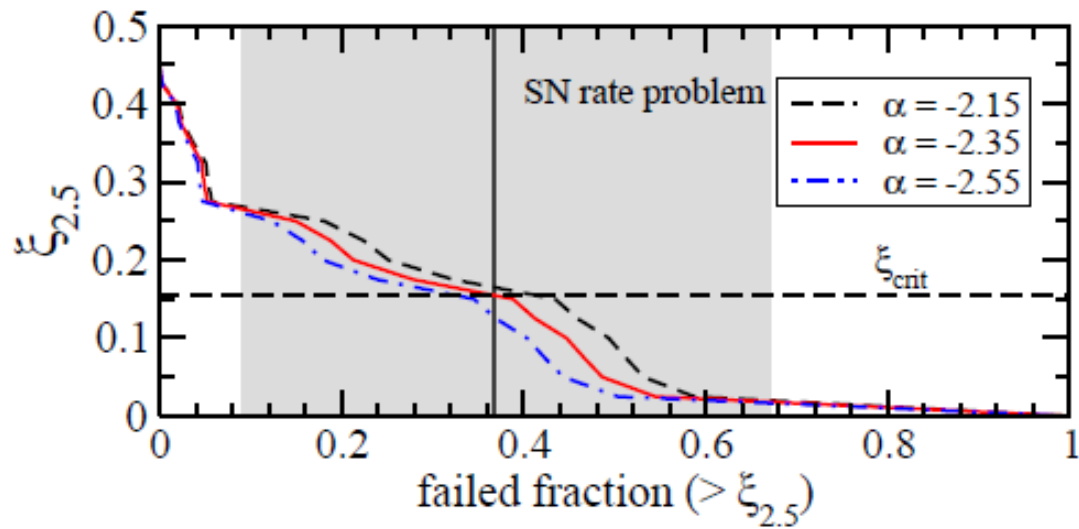
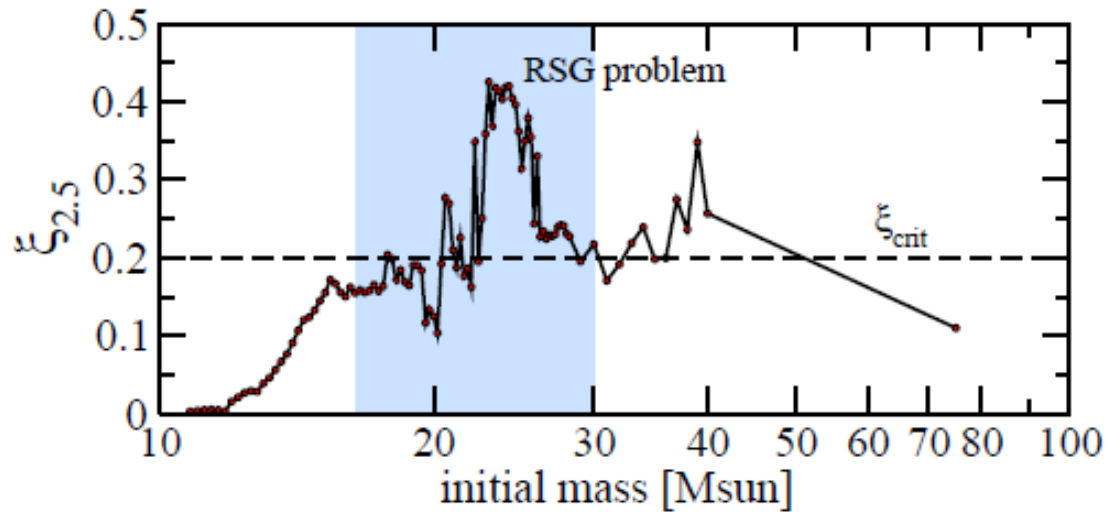
$$\xi = \left. \frac{M/M_{\odot}}{R(M_{\text{bary}} = M)/1000 \text{ km}} \right|_t$$

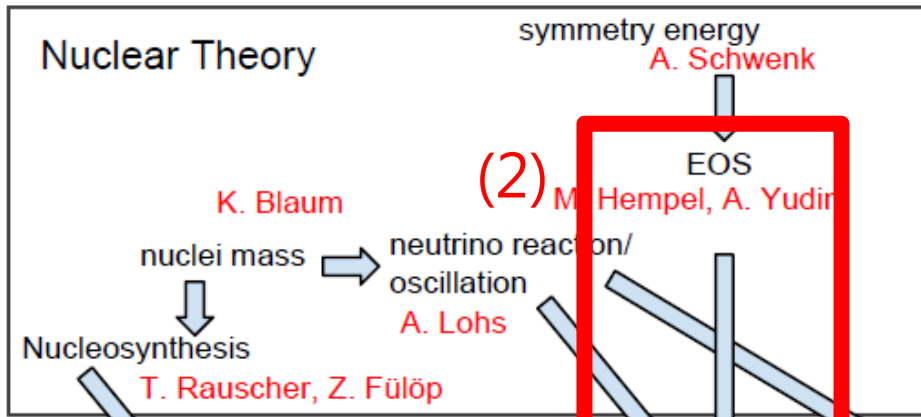


Horiuchi+ 2014



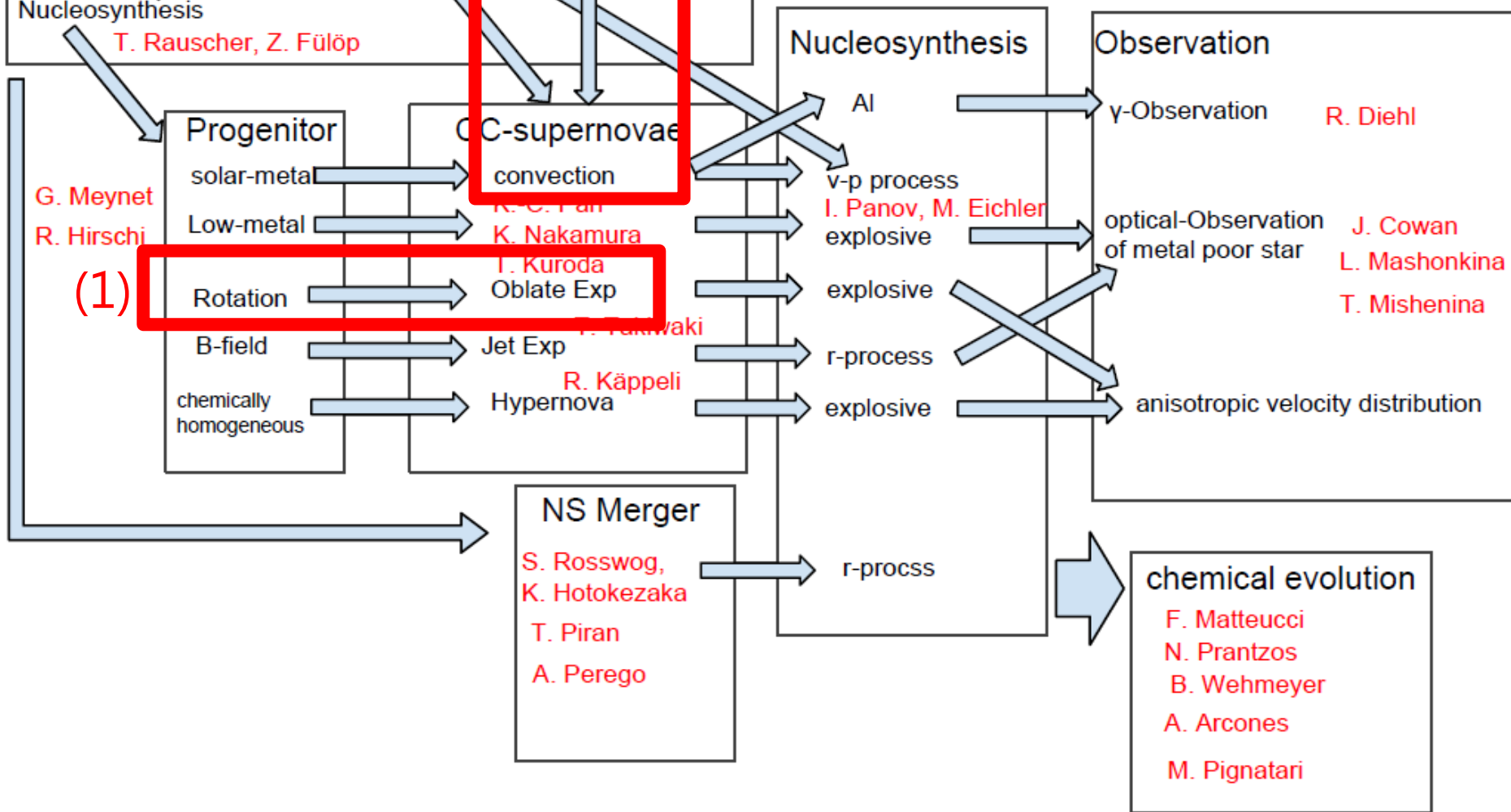
Observational Support





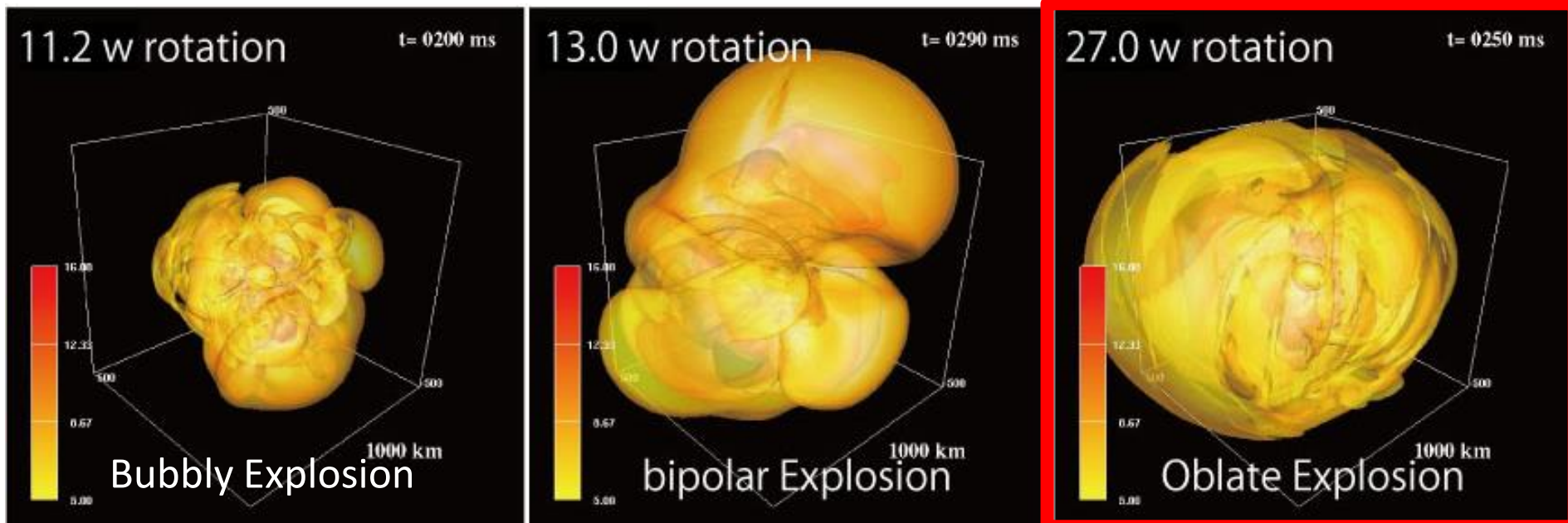
My selfish sketch of this workshop

Tomoya Takiwaki



Rotational Explosion of Core-Collapse Supernovae

Tomoya Takiwaki



Takiwaki+ in prep

Unexpected shape!

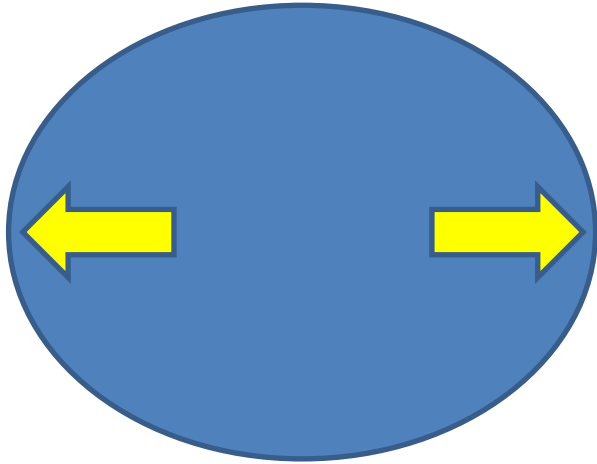
Strong explosion energy!

$\sim 0.5 \text{ foe} @ 500 \text{ ms}$

Site for gravitational wave

(Kuroda+2014)

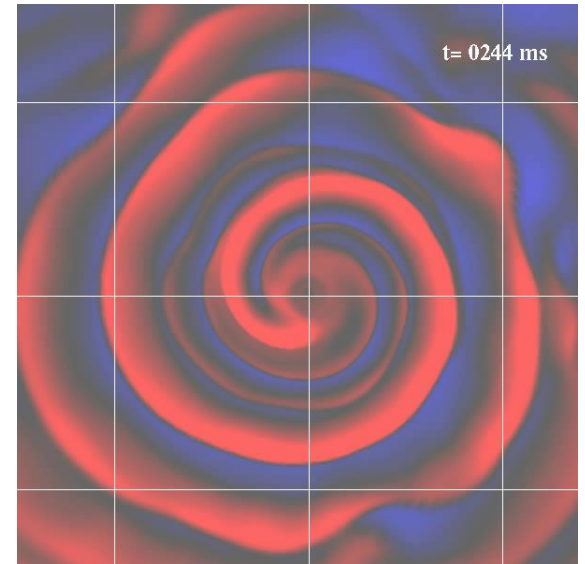
Mechanism



Deformation by
centrifugal force
(Nakamura+2014)



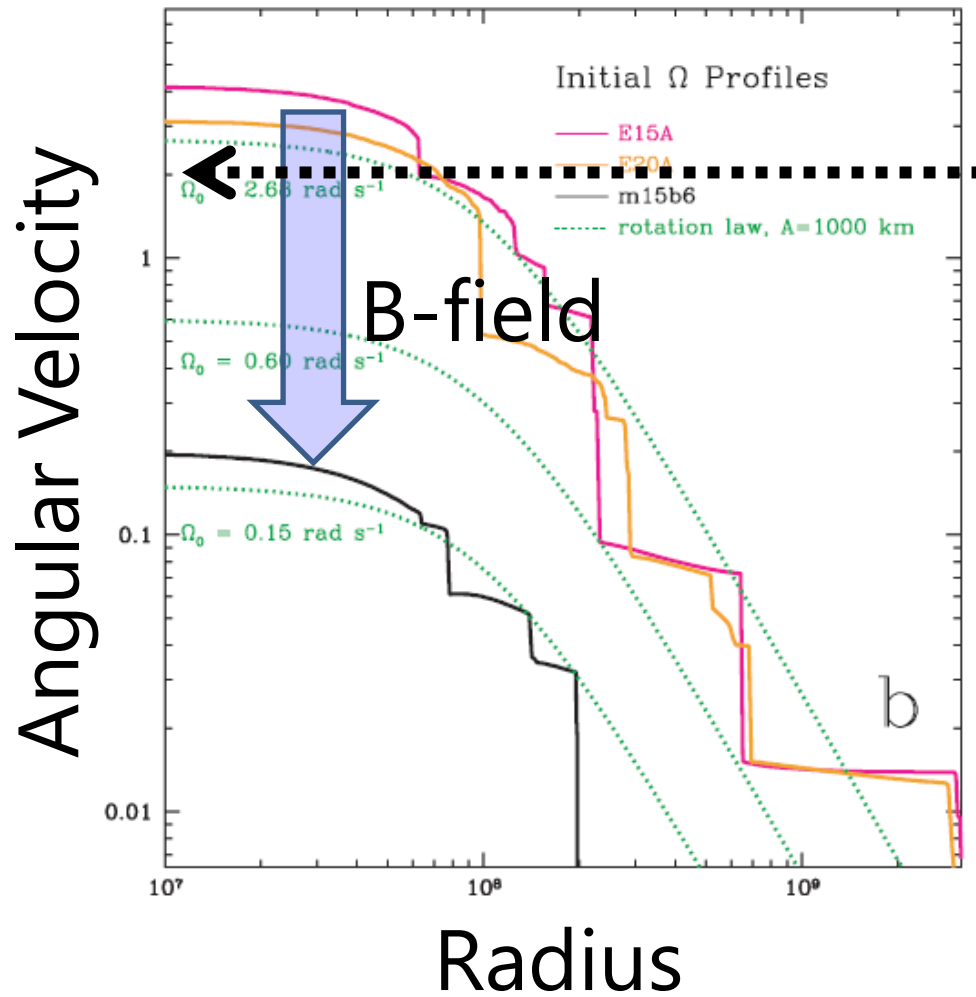
Spiral SASI
(Blondin+2007,
Iwakami+2014)



Low-T/W instability
(Ott+2006,
Takiwaki+ in prep)

Not fully understood.
Investigation is active!

Progenitor



Ott+2006

High angular velocity is assumed for Takiwaki's model.

Question

(1) Can these stars exist?

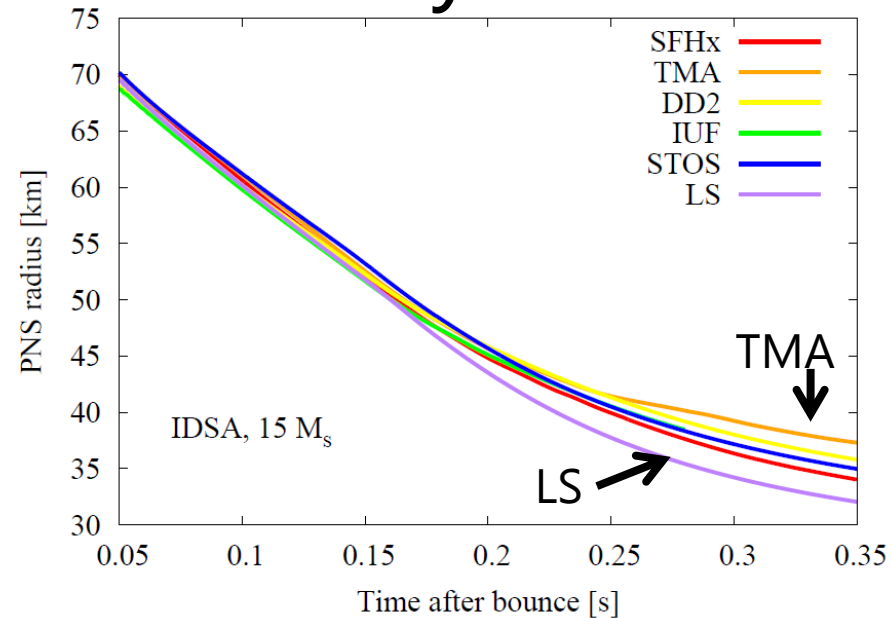
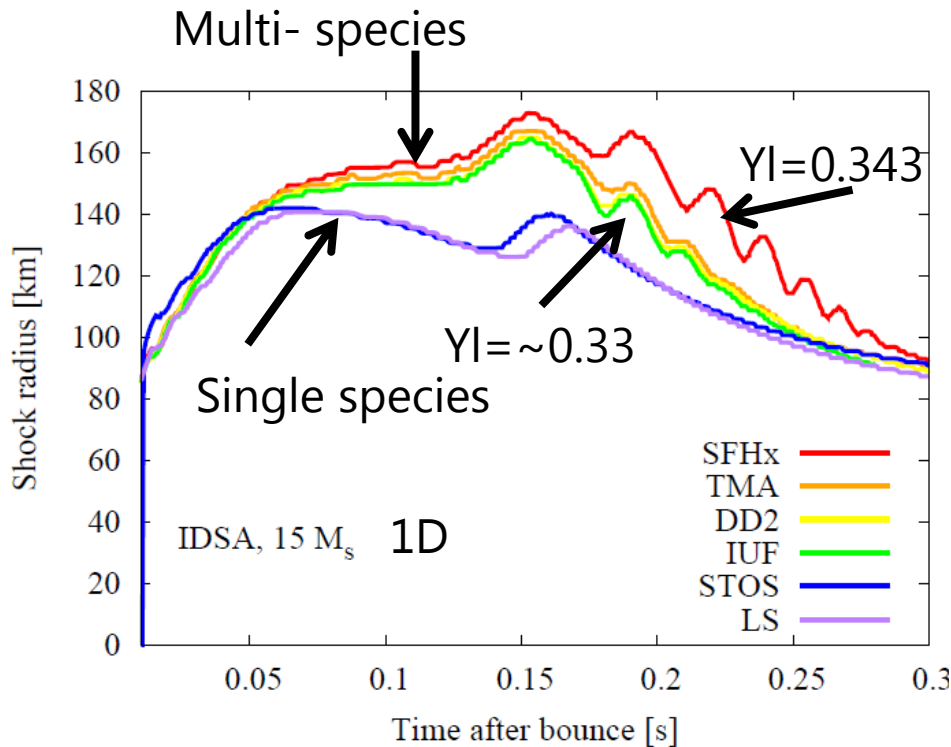
(2) Population?

(3) Can more sophisticated treatment of the B-field change the situation?

Continue to the discussion of magnetic models

Dependence of EOS on ν -driven Explosion

Tomoya Takiwaki

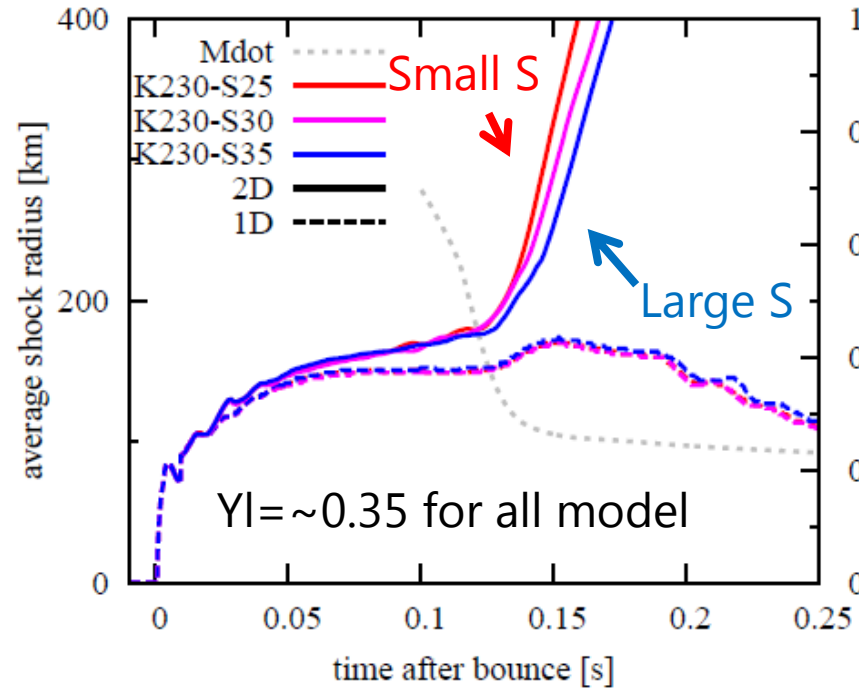
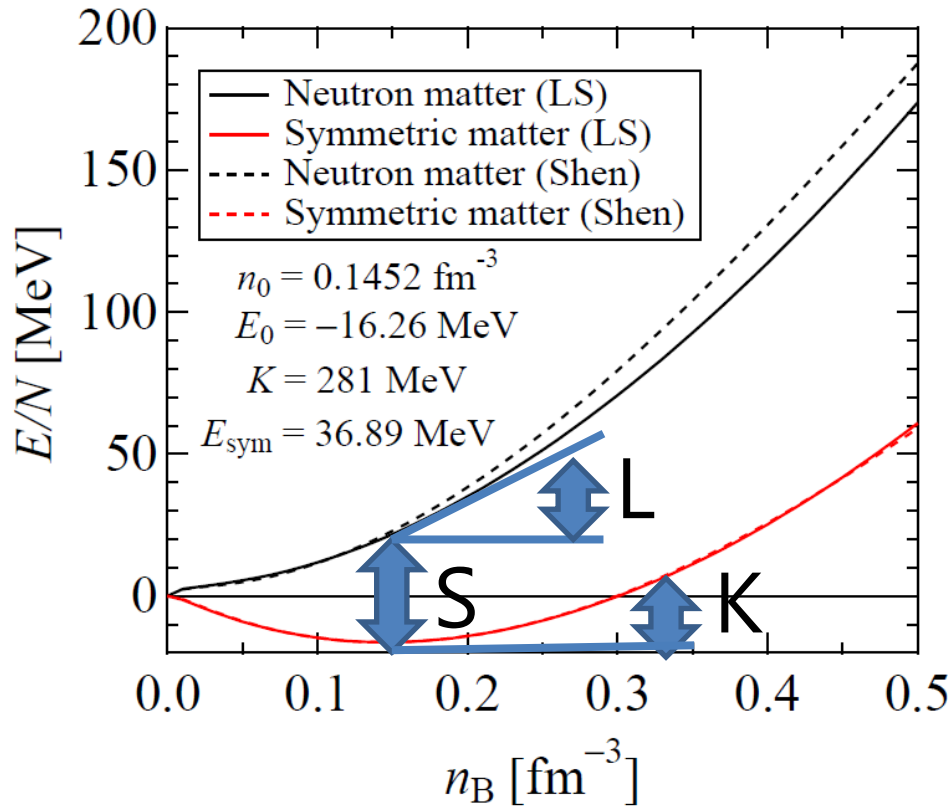


Takiwaki+ in prep

Many kinds of EOS proposed and so far has not yet investigated deeply.

EOS changes the evolution of the shock and PNS.

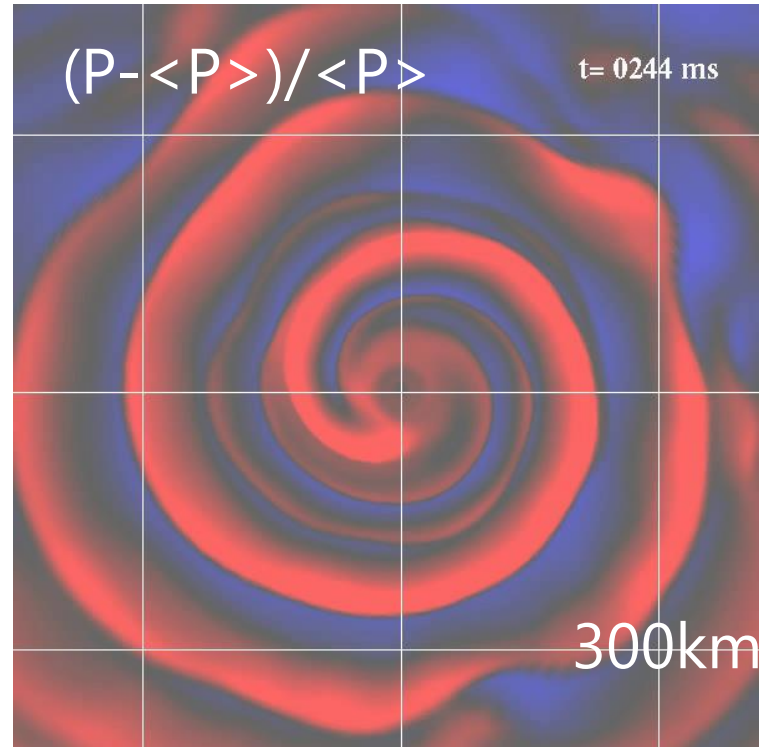
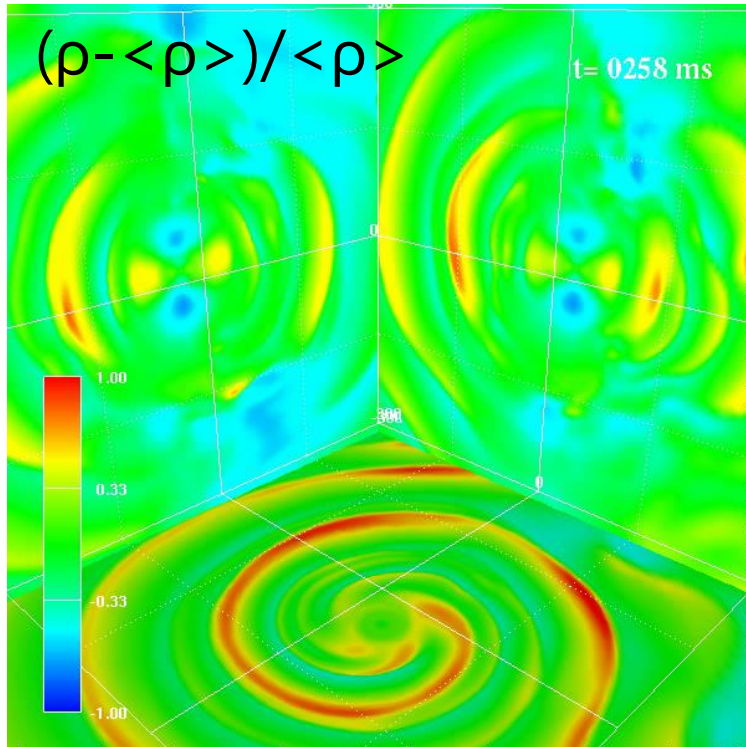
Extract information of K,S,L



LS-parameterization
 Togashi+ in prep

Parametric EOS => easier comparison among model
 The shock is sensitive to S(or L) (not so sensitive to K)
 We have to investigate more.

Rotation

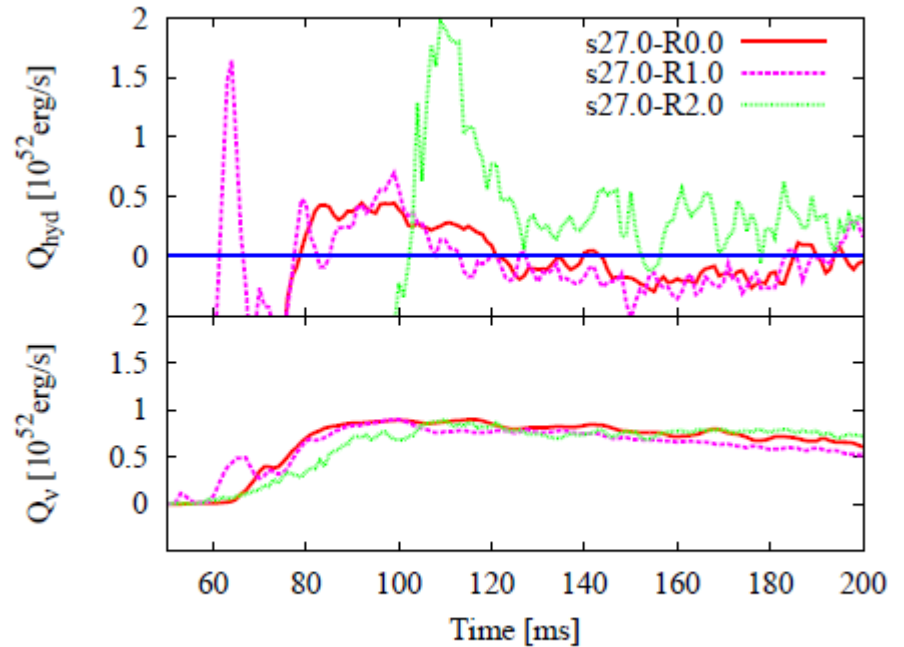
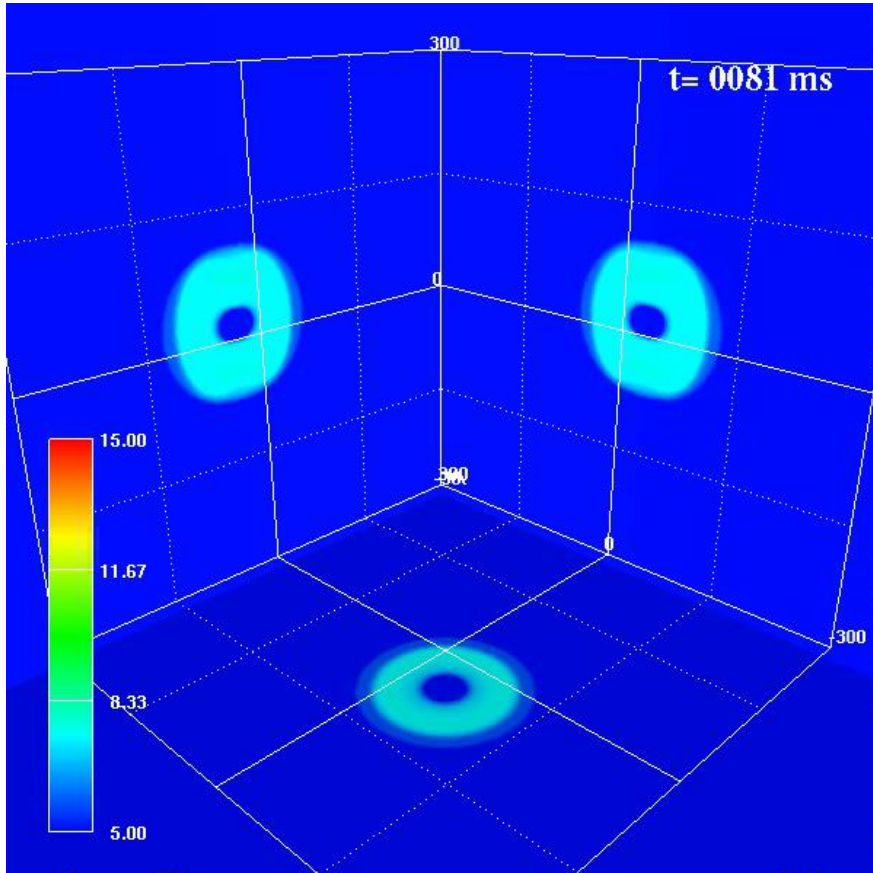


Rotational energy(T)/gravitational energy(W)
reach some criteria => Spiral mode arises

In the rigid ball: 14%

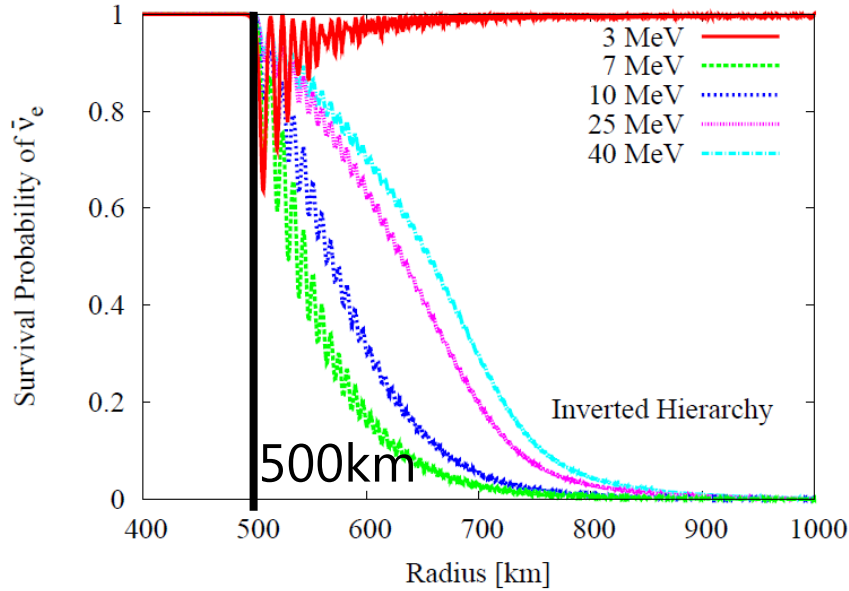
In SNe case: ~ 6% (Called low-T/W instability)

Rotation

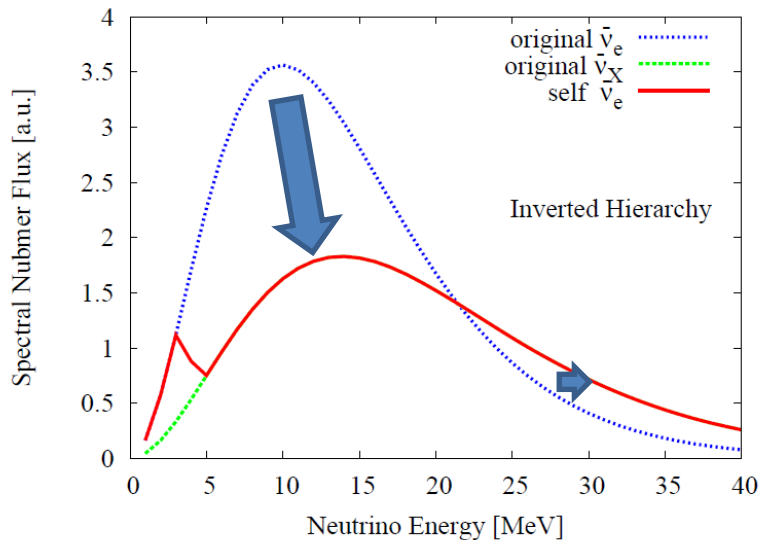
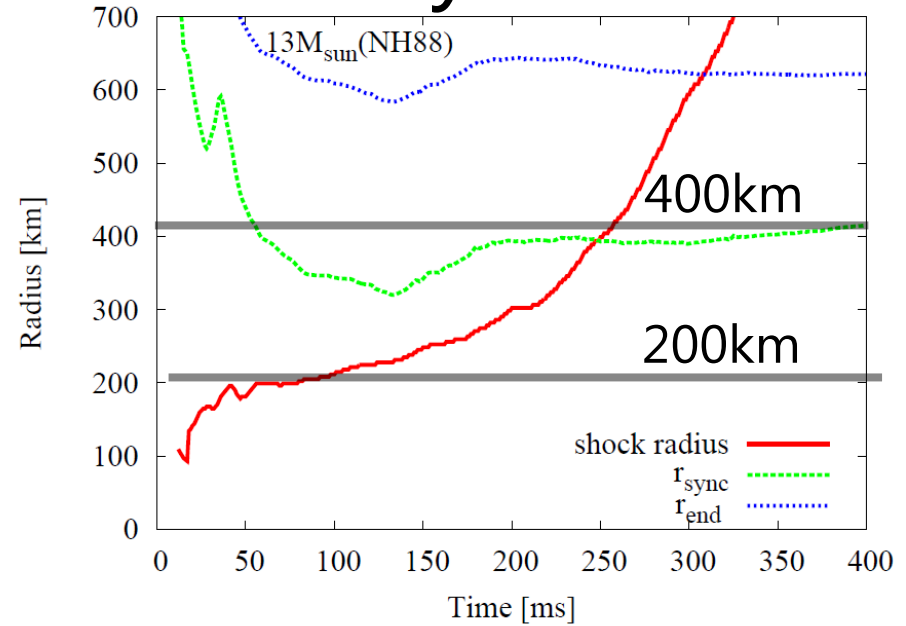


Spiral wave transfer the energy to the outer region.
Finally explosion is found!

Neutrino oscillation



Tomoya Takiwaki



Collective oscillation begin $\sim 500\text{km}$.
 Not affect to the shock revival.
 Caveat: single angle approximation



(see also Dasgupta+2012)