

A. Binary White Dwarfs

The diagram illustrates the proposed formation pathways for CO BWDs, starting from a binary white dwarf (WD) system (M_{WD1}, M_{WD2}) in a dashed box.

Pathway A1: The system evolves into a single remnant (M_{rem1}) with a mass ratio $M_{rem1} \sim 1.06$.

Pathway A2: The system evolves into a single remnant (M_{rem2}) with a mass ratio $M_{rem2} < M_{ch}$, leading to a "One Binary" state.

Pathway A3: The system evolves into a single remnant (M_{rem1}) with a mass ratio $M_{rem1} \sim 1.9$.

Pathway A4: The system evolves into a single remnant (M_{rem1}) with a mass ratio $M_{rem1} > M_{ch}$, leading to a "CO BWD Merger" and a "One Binary" state.

B. Neutron Star - White Dwarf Binaries

The diagram illustrates two evolutionary pathways for Neutron Star - White Dwarf (NS-WD) binaries. At the top right, a dashed box contains two spheres representing a neutron star and a white dwarf, with a dashed arrow indicating a cycle. An arrow labeled $q > q_{\text{crit}}$ points from this box to a central illustration of an 'Unstable Mass Transfer' event, where a red sphere (neutron star) is shown merging with a larger, textured sphere (white dwarf). From this central event, two pathways emerge:
 - **Pathway B1** leads to an 'NS-WD Merger', depicted as a single merged object.
 - **Pathway B2** is labeled with $M_{\text{WD}} \sim M_{\text{Ch}}$ and leads to 'Tidal ejection from WD', shown as a neutron star and a smaller white dwarf with curved arrows indicating orbital motion.
 From the 'Tidal ejection from WD' stage, an arrow points to the final state: 'NS enters WD', which is labeled 'AIC' (Asymptotic Inner Core) and depicted as a neutron star inside a white dwarf.

C. Binary Neutron Star Mergers

Diagram illustrating the outcomes of a binary neutron star (NS) merger:

- Two initial neutron stars, each with mass M_{NS} , merge.
- The resulting remnant can be either a supramassive neutron star (SMNS) or a stable neutron star (Stable NS), depending on the total mass M_{tot} and the remnant mass M_{rem} .
- For a SMNS, the total mass satisfies $M_{\text{TOV}} \lesssim M_{\text{tot}} \lesssim 1.2 M_{\text{TOV}}$.
- For a Stable NS, the remnant mass satisfies $M_{\text{rem}} \lesssim M_{\text{TOV}}$.

Pathway D1

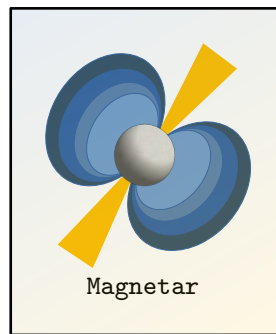
Pathway D2

D. NS/WD - MS Stars

The diagram illustrates two evolutionary pathways, D1 and D2, starting from a common ancestor labeled "D. NS/WD - MS Stars".

Pathway D1: This pathway begins with a red star and a red planet. An arrow points to a yellow star and a red planet, which then leads to a final state represented by a red star and a red planet.

Pathway D2: This pathway begins with a red star and a grey planet. An arrow points to a yellow star and a grey planet, which then leads to a final state represented by a red star and a grey planet.



LEGEND:  CO WD  ONe WD  NS  WD  MS Star  SN Ia