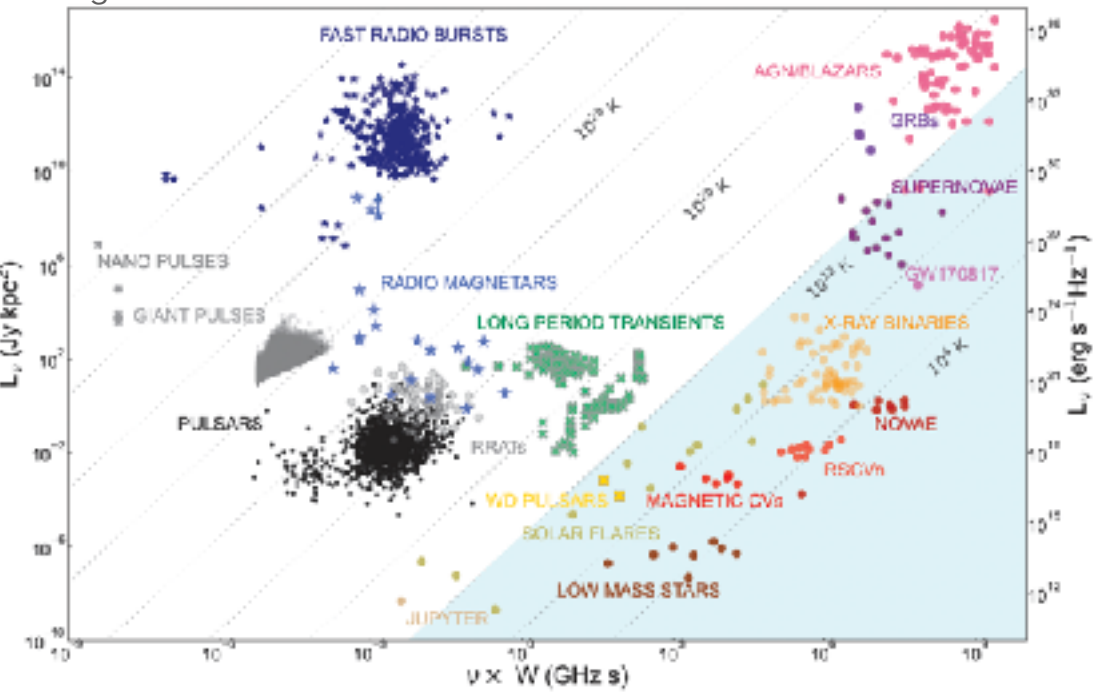
Pulsars and FRBs: populations and emission

Zoo of coherent radio emission source

Figure from Rea et al. 26

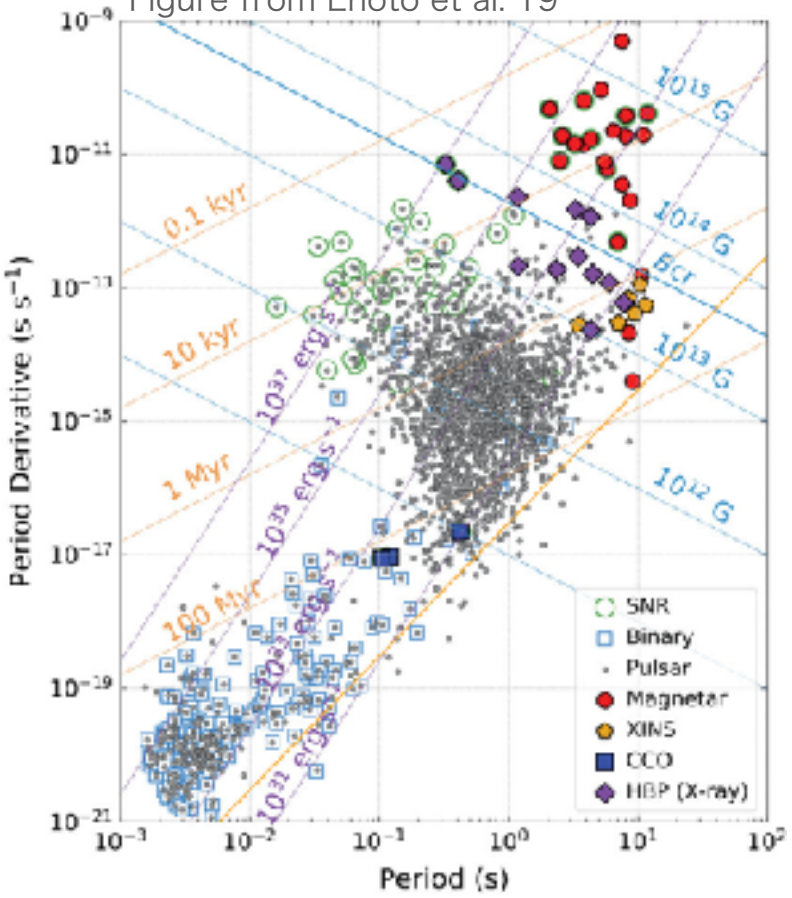


rotation energy vs magnetic field energy (A boundary on the radio transient plain?)

“G”RB, “F”RB, then “E”RB?
What can they be?

NS populations on the P-Pdot diagram

Figure from Enoto et al. 19



FRB sources :
Where they are born?
Are they all magnetars (in their non-giant-flare phase)?
How many kinds of progenitor systems are there?

Poll : 1/2/3/more

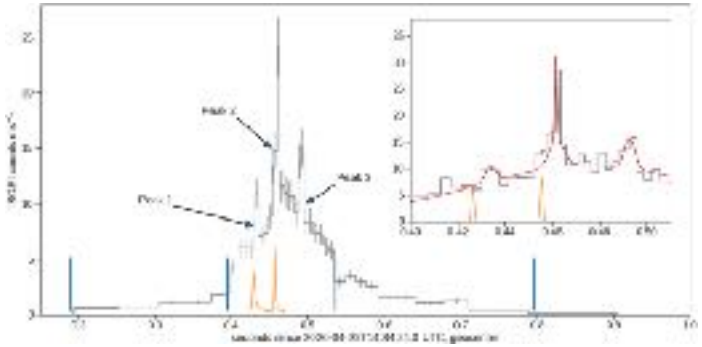
Young NSs (PSRs/magnetars/CCOs):
How they trifurcate?
(or quadrifurcate, if we include LPRTs)

Initial Bs and Ps: log-uniform, bimodal, or else?

Evolution of P, B, inclination angle, …

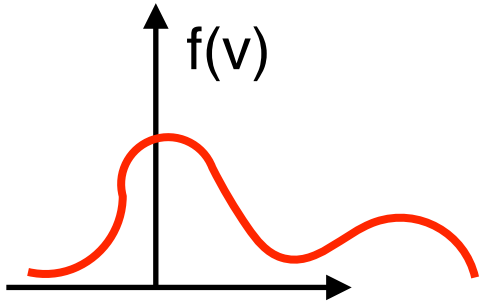
FRBs: where from

- **magnetospheric**
- correlated R-X
- nano-shots
- Pulsar-like RVM
- drifts: radius-to-frequency
- known example of magnetospheric emission (pulsars)
- ~ Solar flares (X and R, magnetically-driven)



FRBs: how

- not a single (pulsars)
- no need for shocks (bulk/stop/distribution func.)
- shocks: fluid to kinetic; No, just start kinetic



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Beam + wave

- System can be in force balance (so, no pressure jumps, no shocks), yet unstable to produce **coherent** radio emission, eg. due to **kinetic** instabilities - can converted into radio large fraction of free energy, no "waste" on baryons, bulk motion etc

- wave + relativistic beam (XFEL)
- better be macroscopic (not skin-scale)