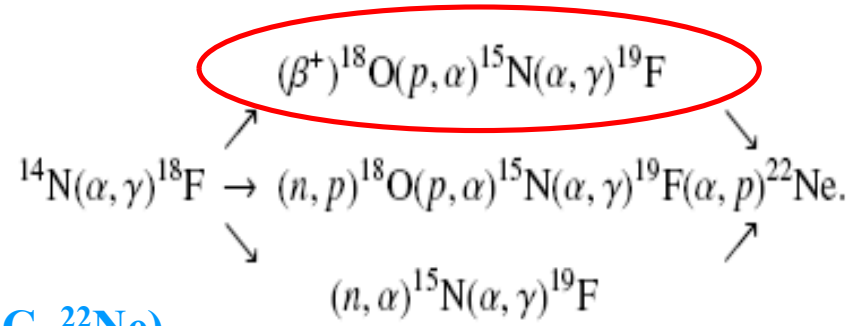
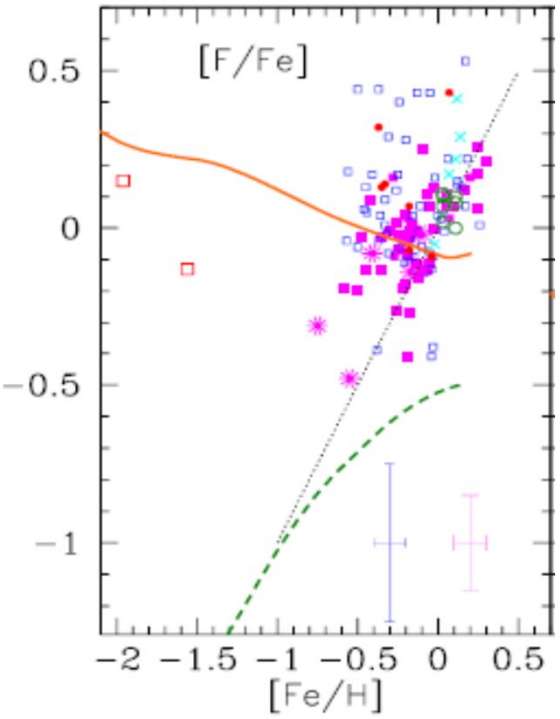
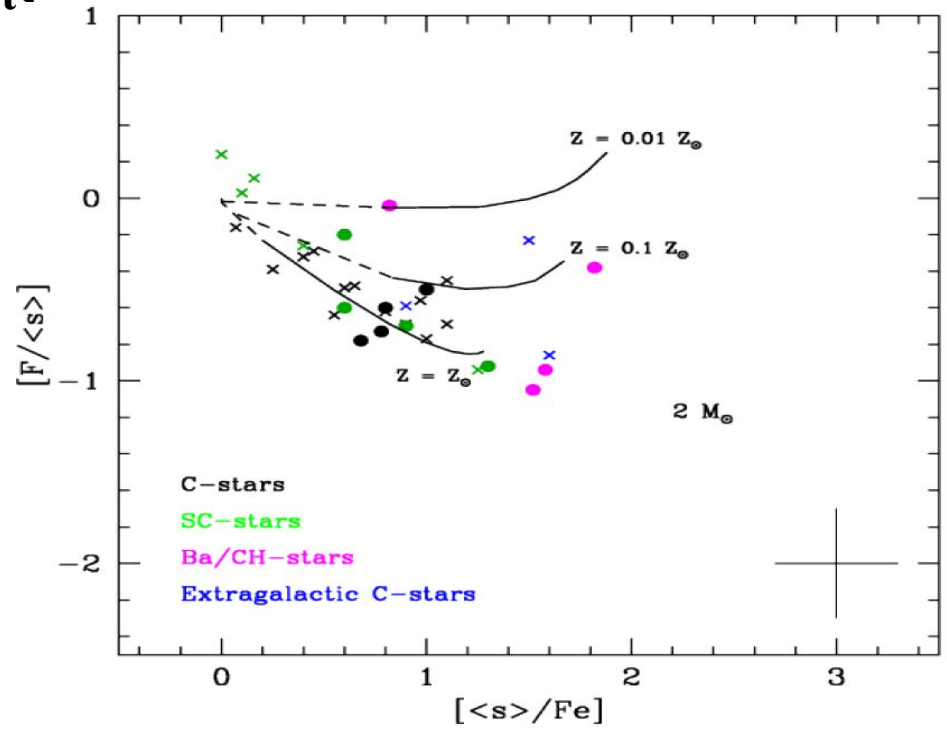
^{19}F production and evolution

- ^{19}F is a fragile element easily destroyed by p & α captures and difficult to observe
  - ν-induced spallation in SN II
  - TP-AGB stars
  - Hydrostatic He-burning in WR
  - WD + He RGB mergers
  - Novae



- ^{19}F has primary & secondary origins (^{13}C, ^{22}Ne)
- Simultaneous production ^{19}F & s-elements





C. Abia, JINA Workshop, Nov 2020

Table 1. Sources of the reaction rates relevant for fluorine nucleosynthesis.

Reaction	Source
$^{14}N(p,\gamma)^{15}O$	1
$^{15}N(p,\gamma)^{16}O$	2
$^{17}O(p,\gamma)^{18}F$	3
$^{18}O(p,\gamma)^{19}O$	4
$^{15}N(p,\alpha)^{12}C$	5
$^{17}O(p,\alpha)^{14}N$	6
$^{18}O(p,\alpha)^{15}N$	7
$^{19}F(p,\alpha)^{15}O$	8
$^{14}C(\alpha,\gamma)^{18}O$	9
$^{14}N(\alpha,\gamma)^{18}F$	10
$^{15}N(\alpha,\gamma)^{19}F$	10
$^{18}O(\alpha,\gamma)^{22}Ne$	10
$^{19}F(\alpha,p)^{22}Ne$	11
$^{13}C(\alpha,n)^{16}O$	12

References. (1) Imbriani et al. (2005); (2) Leblanc et al. (2010); (3) Di Leva et al. (2014); (4) Best et al. (2019); (5) Angulo et al. (1999); (6) Bruno et al. (2016); (7) Bruno et al. (2019); (8) Indelicato et al. (2017); (9) Johnson et al. (2009); (10) Iliadis et al. (2010); (11) D'Agata et al. (2018); (12) Trippella & La Cognata (2017).