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TITLE: Spectroscopy study of born-again planetary nebulae
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ABSTRACT:
The Born-again PNe are formed when the PN central star (CS), a white dwarf, builds up a He shell on its surface which at a certain point reaches critical mass and ignites, producing a very late thermal pulse (VLTP). The event ejects highly processed H-poor and C-rich material at high velocities that expands inside the previously ejected H-rich nebula. As a result, the CS rapidly cools and returns to the starting point of the post-AGB phase, giving it a second life. In a sense, the star is born again.
Only eight born-again PNe have been reported so far: V 4334 Sgr (Sakurai's Object), A 30, A 58, A 78, HuBi 1, IRAS 15154−5258, IRAS 18333−2357, and WR 72. Although it is argued that ≈20% of all CSPNe have gone through a born-again event, their small number is in line with the reduced duration of the VLTP (~20−100 yr). They are thus exceptional objects whose characterization helps us peer into this extraordinary phase of the stellar evolution of low- and intermediate-mass stars.
We have performed a spectroscopic study of three born-again PNe, namely HuBi 1, A58 and A78. In HuBi 1 the poverty in H of the central region allowed us to confirm the born-again nature of the source, only suggested up to that moment. In A58 we have detected variability in the ejecta during the last 20 years. Finally, we have spatially characterized the physicochemical properties with a precision never before achieved for this source.