

# A search for sdBVs and stellar kinematics correlations

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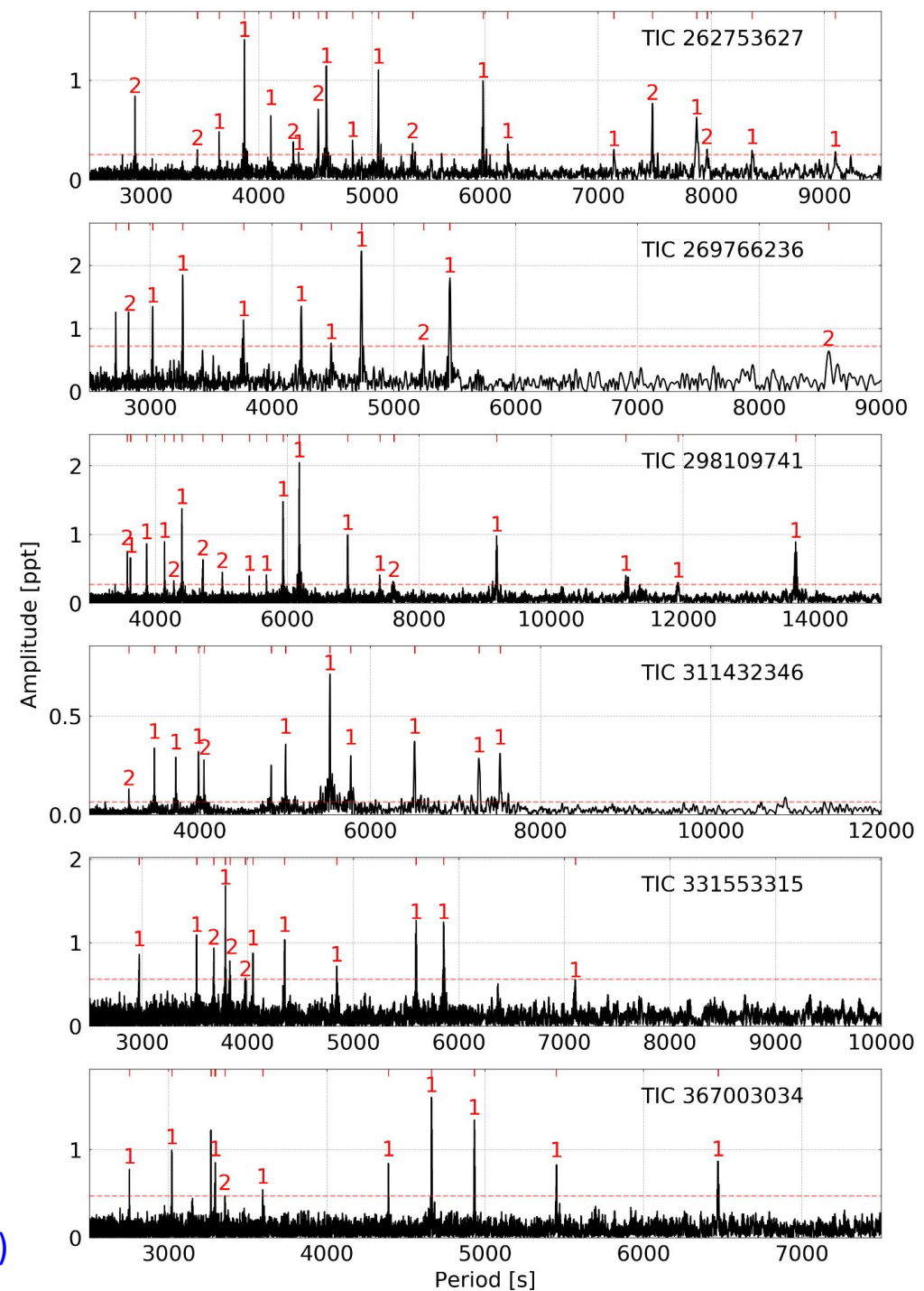


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# Pulsation analyses of six hot subdwarf stars

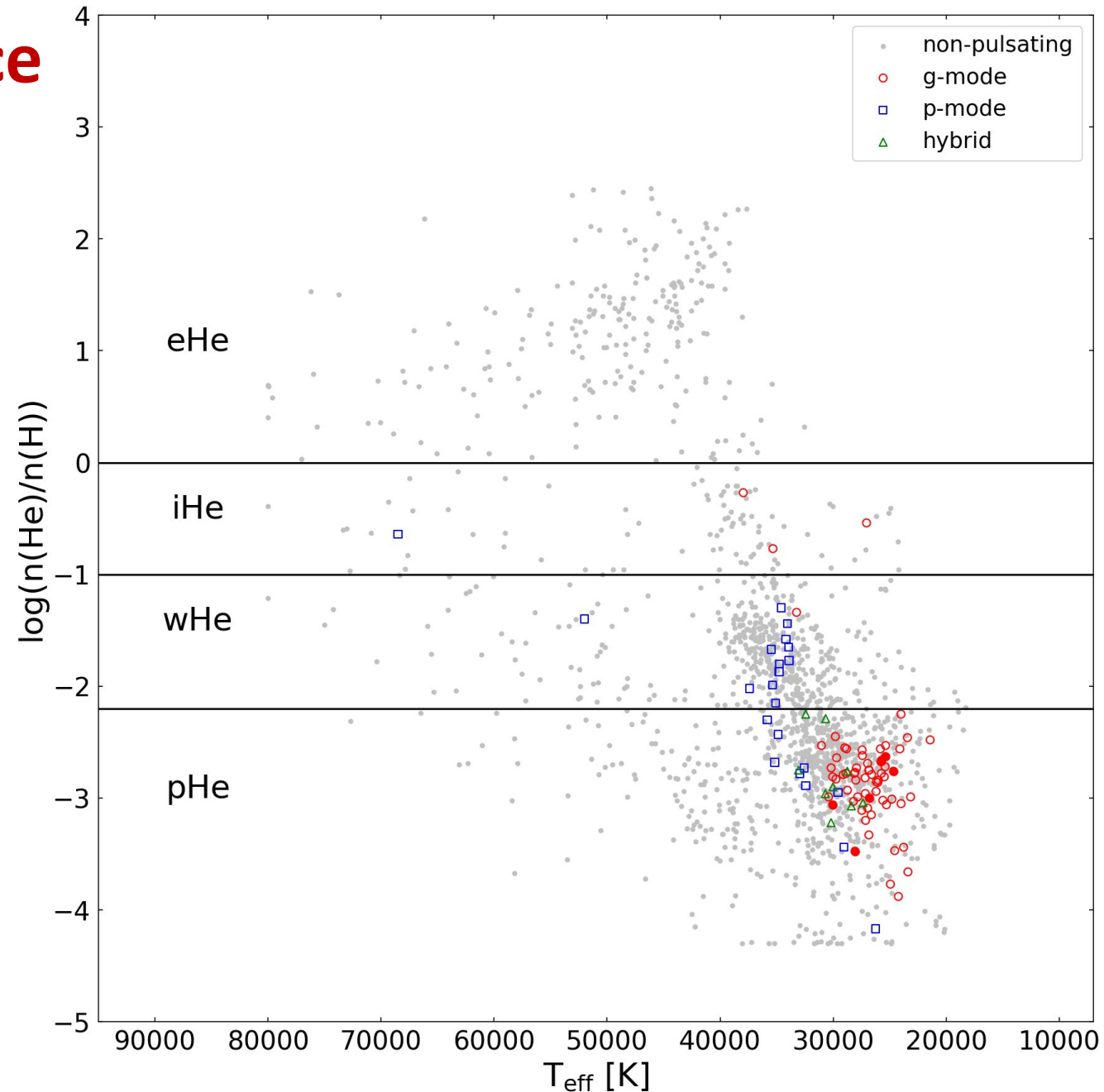
- We did a detailed asteroseismic analyses of six gravity-mode sdBVs observed in the SC mode by TESS
- These sdBVs are TIC 262753627, TIC 269766236, TIC 298109741, TIC 311432346, TIC 331553315, and TIC 367003034
- We determined the mode degrees of these targets using asymptotic period spacing. We did not detect any multiplet splittings
- We collected atmospheric parameters of TIC 262753627, TIC 298109741, TIC 311432346, and TIC 331553315 from the literature and did spectroscopic observations of TIC 269766236 at SAAO, of TIC 298109741 at APO, and of TIC 367003034 at IAO
- Using the identified mode degrees and atmospheric parameters in the evolutionary model calculated by [Ostrowski et al. \(2021\)](#) using MESA, we derived the physical properties of these stars

Sahoo et al. 2024 (in review)



# Pulsations vs helium abundance

- We collected the surface parameters for 1577 hot subdwarfs from [Luo et al. \(2021\)](#) out of which 76 are known pulsators.
- Subdwarfs are divided in four groups according to their helium contents: extreme He-rich (eHe), intermediate He-rich (iHe), He-weak (wHe), He-poor (pHe)
- g-mode pulsators → helium-poor, p-mode pulsators → helium-weak
- Three out of four iHe hot subdwarfs we found thus far are g-mode pulsators



# Pulsations vs Galactic populations

- We derived space velocities (U, V, and W), orbital angular momentum ( $L_z$ ) and orbital eccentricity (e) for 142 subdwarf pulsators, using the Galpy ([Bovy 2015](#)).
- Using the U-V,  $L_z$ -e, and orbit shapes, we derived their galactic membership ([Luo et al. 2021](#)).
- We grouped these sdVs according to their pulsation type and population membership
- The majority of pulsators are in thin and thick disk populations, which is expected
- This conclusion might be biased with our limited sample

	g-mode				p-mode		hybrid
Halo	283870336				68495594 167746025 1204510934		
Thick disk	57257430 82049981 122673493 147349694 154510451	178893906 194807290 279433960 330658435 332742020	<b>367003034</b> 371813244 371833573 381203990 397064286	352480413 369394241 384992041 388940683 389175842 404635917 405266556 405799245 415339307 418789164 429807453 437746793 439905042 455755305 457168745 458452988 461346891 466277784 468980287 800026675	4632676 8787069 47377536 55753808 82359147 115280751	207440585 219492314 266013993 322009509 437051820 801909110	138618727 355754830
Thin disk	4161582 9346617 9358354 14680532 17561485 20448010 21223262 26491429 27782233 33834484 39947484 40050637 43965472 46363456 63449095 63719894 66493797 67584818 80290366 80427831 101817287	118032308 118297100 120638388 121212691 138623536 138707823 142491300 152373379 156623726 158215363 158488181 158918567 159734503 161402643 184607974 219225205 234295068 239930769 240109525 260795163 <b>262753627</b>	<b>269766236</b> 270695353 273084007 273875093 274623605 278659026 281269725 292467033 293165262 <b>298109741</b> 298542142 309658435 <b>311432346</b> 317439554 321287961 <b>331553315</b> 334901449 344719037 345451496 347435900 352315023	352480413 369394241 384992041 388940683 389175842 404635917 405266556 405799245 415339307 418789164 429807453 437746793 439905042 455755305 457168745 458452988 461346891 466277784 468980287 800026675	6116091 60985176 62483415 63168679 70549283 136975077 142200764 165312944 175402069 186484490	202354658 240868270 248949857 273255412 291032641 355058528 366656123 387107334 396954061 436579904	13145616 69298924 169285097 271164763 409644971 437043466

# Contribution to the articles in 2023

- ❖ [Sahoo, S. K.](#), Baran, A. S., Worters, H. L., N´emeth, P., & Kilkenney, D. (2023). *A search for variable subdwarf B stars in TESS Full Frame Images III. An update on variable targets in both ecliptic hemispheres – contamination analysis and new sdB pulsators*. MNRAS, 519 (2), 2486-2499
- ❖ Baran, A. S., Van Grootel, V., Ostensen, R. H., Worters, H. L., [Sahoo, S. K.](#), Sanjayan, S., Charpinet, S., Nemeth, P., Telting, J. H., & Kilkenney, D. (2023). *Short-period pulsating hot-subdwarf stars observed by TESS I. Southern ecliptic hemisphere*. A&A, 669, A48
- ❖ [Sahoo, S. K.](#), Baran, A. S., N´emeth, P., Worters, H. L., Pramod Kumar, S., Joshi, S., & Kilkenney, D (2024). *Seismic modeling of six pulsating hot subdwarfs observed by TESS and Galactic population study of hot subdwarf pulsators*. A&A (in review)

**Thank You**