

## SAMPLE OF WHITE DWARFS TO SEARCH FOR TRANSITING EXOPLANETS FROM OAN-SPM

J. S. Carrasco-Gaxiola<sup>1,2</sup>, Y. Gómez Maqueo Chew<sup>2</sup>, and M. Pereyra<sup>2</sup>

**We present a sample of 18 white dwarfs to observe using infrastructure at Observatorio Astronómico Nacional in San Pedro Mártir in order to search for transiting exoplanets.**

White dwarf observations have shown traces of planetary systems around them (e.g., Veras 2016). White dwarf transit signals are relatively deep, with expected depths of 1-100% (e.g., Agol 2011; Faedi et al. 2011). With durations that range from seconds to a few minutes, short integration times are needed to resolve the transit signals due to exoplanets orbiting the WDs. At Observatorio Astronómico Nacional in San Pedro Mártir (OAN-SPM), the project Transneptunian Automated Occultation Survey II (TAOS-II) is expected to acquire images at 20Hz with photometric precision better than 0.1 mag for  $M_V \leq 15 - 16$  mag (Lehner et al. 2018).

We developed a methodology to select a sample of white dwarfs potentially observable with TAOS-II (Carrasco-Gaxiola 2021), which follows the next steps: (a) created the tool COordinaTes crossmaTch ON TAos fieLds (COTTONTAIL<sup>3</sup>); (b) implemented COTTONTAIL to crossmatch the TAOS-II fields of view and the catalog of white dwarfs (WDs) and white dwarfs candidates (WDCs) with Gaia data (Gentile-Fusillo et al. 2019). We select the spectroscopically confirmed WDs and WDCs with high confidence of being a white dwarf, and selected the brightest ones with  $G_{\text{band}} \leq 16$  mag.

From 486611 objects in the full catalog of (Gentile-Fusillo et al. 2019), we find 3617 WDs and WDCs in the TAOS-II fields of view (see Fig. 1). From the sample of 3617 objects, 248 are spectroscopically confirmed WDs and 1842 are high confidence WDCs. After a cut in brightness, we obtain our final sample of 18 WDs and high confidence WDCs within the TAOS-II fields of view and that are bright enough to obtain light-curves with TAOS-II.

After searching the literature for our sample, we have 12 confirmed WDs with Gaia DR2

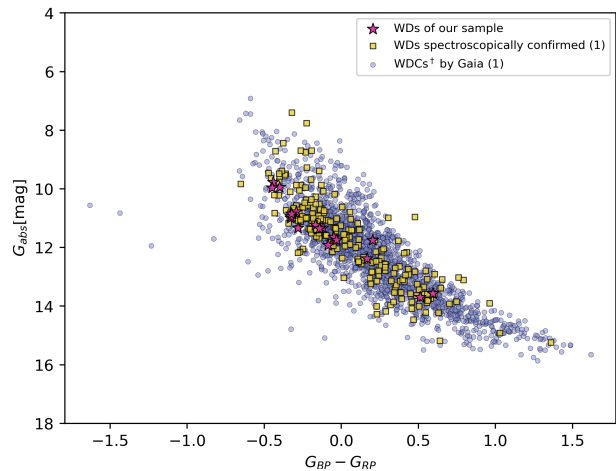


Fig. 1. Gaia HR diagram for our sample (red stars) and the WDs (yellow dots) and high-confidence WDCs (purple dots) in the TAOS-II fields.

ID: 3875652014008894720, 672856143597851520,  
44901791432527232, 3698872156539379968,  
3811876594386673408, 3810933247769901696,  
3799009353404271488, 1896636873351587840,  
170065281698249728, 3415788525598117248,  
6305900675097580800, 6865430941202657408;  
and 6 high confidence WDCs: 672816969200760064,  
1763433449125019392, 57021123989934464,  
377231139432432384, 6247293647327206144,  
1763221793136736000.

*Acknowledgments.* This work was supported by UNAM DGAPA-PAPIIT grant IG101321.

### REFERENCES

- Agol, E. 2011, *ApJ Letters*, 731, 31  
Carrasco-Gaxiola, J. S. Estudio preliminar de los proyectos TAOS-II y DDOTI para la búsqueda de exoplanetas transitantes desde el OAN-SPM. (B.S. thesis, Universidad Autónoma de Sinaloa, Culiacán)  
Faedi, F., West, R. G. et al. 2011, *MNRAS*, 410, 899  
Gentile Fusillo, N. P., Trembay, P. E. et al. 2019, *MNRAS*, 482, 4570  
Lehner, M. J., Wang, S. et al. 2018, *Ground. Air. Ins. Ast. IV*, 10700, 107004V.  
Veras, D., 2016, *RSOS*, 3, 150571

<sup>1</sup>Facultad de Ciencias de la Tierra y el Espacio, Universidad Autónoma de Sinaloa, 80020, Culiacán, Sinaloa, México (jscarrazco@astro.unam.mx).

<sup>2</sup>Instituto de Astronomía, Universidad Nacional Autónoma de México (IA-UNAM), 04510, México.

<sup>3</sup><https://github.com/astrosebas/COTTONTAIL>