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White dwarfs with infrared excess: Gaia and the Virtual Observatory (poster pitch)

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White dwarfs (WDs) are one of the most common objects in the universe. They are stellar remnants of low and intermediate mass stars, such as the Sun. WDs are compact objects, with typical masses around half a solar mass and planetary sizes. The superb astrometric data provided by Gaia has been a revolution in the field, like the discovery of several cooling branches in the Gaia Hertzsprung-Russell diagram which were unpredicted by the models and which still remain not fully explained. In addition, thanks to Gaia the number of known WDs in the Galaxy has increased tenfold, allowing us to perform more detailed studies of peculiar types of WDs, such as WDs with infrared excesses that may be due to debris disks or substellar companions. They are key sources in the understanding of the composition and evolution of exoplanetary material around intermediate mass stars in their late stages of evolution.

In this poster we describe the work aimed at identifying nearby (< 100 pc) WDs with infrared excess. Starting from the so far most complete volume-limited WD sample built from Gaia-DR3 data (Jiménez-Esteban et al. 2023MNRAS.518.5106J), we use Gaia DR3 spectra and the GaiaXPy tool to obtain J-PAS photometry. With the help of VOSA, a Virtual Observatory tool, the J-PAS photometry is complemented with photometry in the infrared and used to build the spectral energy distribution (SED). In a second step, SEDs are compared to model atmospheres to identify flux excess at infrared wavelengths.

Once we have got rid of the potential sources of contamination, the origin of the excess can be attributed to two causes: The presence of a low mass companion or the existence of a circumstellar dust disk. Spectroscopic observations are required to discern between the two possible scenarios. This is why we started a follow-up program of the most promising candidates using the X-Shooter instrument at the Very Large Telescope. In this poster, we will show the first results obtained in this analysis.

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