Completing the 40 pc spectroscopic sample of Gaia white dwarfs

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The Gaia spacecraft has enabled us to create a catalogue of high-confidence white dwarf candidates in the local stellar population, using its highly accurate photometry and parallax measurements. To confirm the nature of these white dwarf candidates, we must obtain spectroscopic observations for each source. With spectroscopic data, we can infer the atmospheric composition of the stars and therefore accurately fit their photometry. We can also fit the spectra using state-of-the-art model atmosphere codes to determine the effective temperatures, masses, and cooling ages of the white dwarfs. We now have a volume-complete sample of around 1100 white dwarfs within 40 pc with spectroscopic follow-up. This sample covers eight times the volume of the previous largest volume-complete 20 pc sample. I will present an analysis of the spectroscopic observations of the remaining 254 white dwarf candidates from Gaia EDR3 in the southern hemisphere. When combined with already published spectroscopy, the 40 pc sample now has roughly 97% spectroscopic completeness. I will discuss some of the notable white dwarfs in this southern hemisphere sample, including metal-polluted white dwarfs with carbon lines, and highly magnetic white dwarfs. I will also explain how we can use the volume-complete 40 pc sample to study star formation history in the stellar neighbourhood, as well as looking at the issues and biases of the sample and how these can be reduced going forward.