

# Calibration and Standardization of Large Surveys and Missions in Astronomy and Astrophysics



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## DA-Type White Dwarfs: Soft X-ray Standards for the Calibration of X-ray Instruments

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Thermal soft X-ray emission is detected from many hot hydrogen-rich white dwarfs (spectral type DA) with an effective temperature in excess of 20 000 K. Most of the objects with effective temperatures  $< 40\,000$  K have virtually pure hydrogen atmospheres while the majority of the hotter ones emit X-ray fluxes lower than predicted by hydrogen model atmospheres and therefore must contain heavier elements as absorbers.

Although such objects have a relatively soft X-ray spectrum, they are invaluable for the calibration of X-ray instruments. The hydrogen-rich DA-type white dwarfs HZ 43 A and Sirius B with effective temperatures of 51 100 K and 24 900 K, respectively, were used to establish soft X-ray standards: A cross-calibration between the Chandra LETG+HRC-S, the EUVE spectrometer, and the ROSAT PSPC was successfully performed.

The DA-type white dwarf HZ43 A provides, thus, an ideal calibration target for space-borne X-ray missions that cover the soft X-ray range.

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