**D-line doublet observations of Na-like ions**

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We present simultaneous measurements of the \( D1 \) (3s-3p\(_{1/2} \)) and the \( D2 \) (3s-3p\(_{3/2} \)) transitions in Na-like ions of yttrium [1], zirconium, niobium, molybdenum, praseodymium, neodymium, rhenium, osmium, and iridium. The highly charged species were created using the NIST electron beam ion trap (EBIT) [2] and the spectra were recorded with a flat-field grazing-incidence extreme ultraviolet (EUV) spectrometer [1]. The collisional-radiative (CR) modelling code NOMAD [3] aided the line identification measurements of these \( \Delta n = 0 \) transitions. The CR model uses a realistic non-Maxwellian electron energy distribution applicable to the EBIT and input atomic data from the FAC [4]. We show comparisons of the experimental wavelengths to those determined from relativistic many-body perturbation theory (RMBPT) [5] and \( S \)-matrix QED calculations [6]. Our experimental wavelengths agree with both theories overall, with deviations occurring at higher \( Z \) values. These comparisons test the accuracy of the calculation of QED corrections for the sodium isoelectronic sequence at high \( Z \) values, where experimental observations are lacking. In addition to the Na-like \( D \)-doublet observations, we also report measured wavelengths for transitions arising from the Si-, Al-, and Mg-like charge states of these ions.

**References**