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A Heat Pipe Setup for Resonant Ionisation Spectroscopy of Zinc

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Resonant Ionisation Spectroscopy (RIS) is a technique to selectively ionise a particular element or even isotope. It has applications in the production and quality assurance of isotopes for medical applications. It is also applied for the production and study of beams of exotic nuclei in large nuclear physics facilities such as CERN. We report on the development of a heat pipe based setup for atomic spectroscopy that will be used to investigate and optimise resonant ionisation schemes for Zinc (Zn). RIS is a multi-step process of which the first 1 or 2 photons are resonant, and the last photon ionises the atom. We apply a novel setup for atomic absorption spectroscopy using multiple laser beams and time-delayed pulses to investigate and characterise the different steps in the RIS scheme. A python program was created to analyse the data that will be obtained. The design and development of the setup and preliminary results are presented. The results are relevant to inform the design of an optimised resonant ionisation scheme that could be applied in industry within the limitations posed by a production environment.

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