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Stopping power cross section of Hf and Pd for protons and alpha particles in the energy range between 0.3 and 2.5 MeV

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Understanding the mechanism of energy loss of charged particles in matter is very important in atomic and nuclear physics given its application in fields such as material and surface science or radiation damage studies. In the last few years, there has been a renewed interest in increasing the accuracy of energy loss and straggling experimental values in order to determine some key parameters included in the theory of stopping power. However, there is still a lack of data about the straggling and the stopping power even for light ions.
In this work we present new data on the stopping power of Hf and Pd for protons and alphas particles in the energy range between 0.3 and 2.5 MeV. These measurements were carried out by using a 2.5 MV Van de Graaff accelerator of the Laboratory of Accelerators and Radiation Technologies (LATR) in C2TN/IST (Lisbon, Portugal). Transmission methodology was used to determine the stopping power cross sections by measuring the energy loss of protons and alphas passing through very thin foils made of Hf and Pd. So far, a good agreement has been found between the obtained results and values reported in literature (SRIM-2013, ICRU49). Additionally, modified Bethe–Bloch theory is being used to extract Pd mean excitation/ionization energy (I) and Barkas effect parameter (b) from the available experimental data.

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