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Temperature and Energy Dependence of Muonium in LaAlO3

$LaAlO_3$ (LAO) is, alongside $SrTiO_3$ (STO), and sapphire one of the most commonly used substrates for complex metal-oxide thin film growth. LAO plays a crucial role in inducing interesting physical properties, such as in $LaNiO_3$/LAO superlattices and interface superconductivity at STO/LAO interfaces. While μSR studies have characterized STO, sapphire, and LSAT regarding Muonium formation - a critical factor when quantifying thin film LE-μSR results - surprisingly little is known about Muonium formation in LAO. In this work, we present comprehensive bulk and low-energy μSR measurements revealing the energy and temperature dependence of different muon charge states in LAO, effectively addressing this significant knowledge gap in the characterization of this important substrate material.

Email

andreas.suter@psi.ch

Funding Agency

Supervisors Name

Supervisors Email

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Primary author: Dr SUTER, Andreas (PSI)

Co-authors: Dr JANKA, Gianluca (PSI); Dr PROKSCHA, Thomas (PSI); SALMAN, Zaher (PSI)

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