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A 3T compatible in-situ ^3He analyser for KWS1

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We present a compact ^3He polariser to be used as polarisation analyser for KWS1. The 38 cm long magic box magnetic cavity with angled plates on the entrance side provides a ^3He magnetic lifetime of 300 hours with the cell centred in the device, up to 7 cm diameter cell is used and polarization is performed with one laser, a relatively large angular coverage providing up to $\pm 0.07^\circ \text{A}^{-1}$ at 4.5°A is possible due to its close proximity to the sample and sample magnet. When used with the HTS-110, New Zealand sample magnet and a 3T horizontal (towards the ^3He cell) field this magnetic lifetime was reduced to 163 hours, This level of performance is more than adequate, especially for an in-situ polarized system where spin-exchange rates on the order of 10 hours or less can be obtained. The system was recently used in tests at TU Delft and ISIS and ^3He polarisation of 65 % was obtained.

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