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The Multi-Blade ^{10}B-based neutron detector

The Multi-Blade is a ^{10}B-based gaseous detector conceived to face the neutron-reflectometry challenge to be presented by the European Spallation Source (ESS), where the instantaneous neutron flux on detectors will be without precedent. Reflectometry instruments in particular require high count-rate capability and excellent spatial resolution.

The detector consists of a stack of Multi Wire Proportional Chambers operated at atmospheric pressure with an 80/20 Ar/CO_2 gas mixture. Modularity is achieved using multiple identical units known as cassettes. A cassette consists of a $^{10}B_4C$-coated converter blade instrumented with a two-dimensional readout system in the form of a plane of strips and an orthogonal plane of wires. In order to optimize neutron conversion, improve spatial resolution, and increase count-rate capability, the blades are inclined at 5^o with respect to the direction of the incident neutron beam.

The detector has been characterized for gamma-ray and fast-neutron sensitivity at the Source-Testing Facility of Lund University, Sweden. Moreover, a measurement campaign at the CRISP reflectometry instrument at ISIS in the UK has been successfully conducted, demonstrating the technology to be ready for scientific instruments.

An overview of the detector together with the results of the characterizations will be presented.

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