

Measurements of SOLEIL Insertion Devices Using Pulsed Wire Method

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Permanent magnets insertion devices are usually measured at SOLEIL with a rotating coil for field integrals and multipoles optimization and Hall probes in order to evaluate the electron angular deflexion, their deviation and the optical phase error, a figure of merit related to the quality of the insertion device radiation. A pulsed wire bench is under development at SOLEIL for reducing the measurement time of an undulator/wiggler and providing a measurement method without lateral access. A current pulse injected in a stretched wire inside the magnetic field area generates acoustic waves. The wire motion is detected by optical sensors whose signals are proportional to the local integral value. The limitation of the signal-to-noise ratio by electronic and optical noise, external and natural wire vibrations has been restrained thanks to hardware optimization, leading to a value of 26 dB, making the method more accurate and reproducible. Measurements of magnetic fields, first and second integrals performed using pulsed wire and Hall probes are compared on three different types of insertions: 18 and 20 mm period in-vacuum undulators, a 60 mm period APPLE-II one and a 50 mm period in-vacuum wiggler.