Installation and Commissioning of the HIgh REsolution hard X-ray single shot spectrometer (HIREX spectrometer) for photon diagnostics in the SASE1 beamline of the European XFEL

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The European X-ray Free Electron Laser (European XFEL) in the Hamburg area of Germany will be a 4th generation light source facility. The European XFEL will deliver XFEL pulses at 4.5 MHz repetition rate with femtosecond pulse length. There will be 2700 pulse/train and each train runs at 10Hz. There are three undulators: SASE1 and SASE2 provide hard X-ray FEL radiation in the energy range of 3 keV to 25 keV, while SASE3 provides soft X-ray radiation below 3 keV. An important task of the x-ray photon diagnostics group at the European XFEL is to provide reliable tools for measurements aiming at studying the properties of the FEL radiation which is created by the SASE process (Self Amplified Spontaneous Emission), whose stochastic nature gives rise to shot-to-shot fluctuations in most beam properties, including pulse energy, duration, spatial profile, wavefront, temporal profile, and spectrum. The resulting spectrum will vary considerably from shot to shot. In order to cover these variations, the HIgh REsolution hard X-ray single shot spectrometer (**HIREX spectrometer**) has been installed in the photon tunnel XTD9 of the SASE-1 undulator branch. HIREX spectrometer is an on-line device, based on a diamond diffraction grating used in transmission to split off a small fraction (0.1%) of the photon beam, a bent crystal as a dispersive element, and a MHz-repetition rate strip detector. In this contribution we will discuss the Installation and Commissioning of HIREX spectrometer with XFEL beam and will present the preliminary spectral measurement.