

VUV and Soft X-ray metrology stations at the International Siberian Synchrotron Radiation centre

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At present, there are two experimental stations under construction at the International Siberian Synchrotron Radiation centre (Novosibirsk, Russia). They are intended for metrology work in the VUV and soft X-ray spectral ranges with the application of SR from the storage rings of VEPP-3 and VEPP-4.

The soft X-ray metrology station (the spectral range is from 80 to 5000 eV) at the storage ring of VEPP-3 makes it possible to perform very different works for time and absolute spectral calibration of various X-ray detectors as well as absolute and relative certification of elements of X-ray optics (multi-layer mirrors, multi-layer lattices, absorption film filters etc). The first line of the station has been commissioned already. Certification of power of the incoming "white" SR beam is under way now. The monochromator is being prepared for commissioning. Its design allows one to use both multi-layer mirrors as well as crystals as x-ray optical spectral elements. The first experiment is supposed to deal with experimental investigation of possibility of broadening the self-calibration method [1] in order to use it later to calibrate scintillation counters. Another task of the first experiment is a preliminary test of elements of the Space Solar Patrol (SSP, made by SOI, St. Petersburg) [2] within the framework of ISTC project #2500, which is devoted to SSP calibration.

The VUV and soft X-ray metrology station with the application of SR from the VEPP-4 storage ring is being developed at the moment. In contrast to the similar station at VEPP-3, the spectral range of this station (from 10 to 1000 eV) allows one to perform calibration measurements in the

VUV range. Due to partial overlapping of the spectral ranges of these stations one can check at one station a calibration done at the other. The metrology station of VEPP-4 is to be equipped with two monochromators. Those are a lattice one (the spectral range is 10 to 100eV) and a two-mirror monochromator based on multi-layer mirrors (the spectral range is 80 to 1500 eV). Since the experimental space of the station is rather large (about $0.7 \times 0.5 \times 0.5$ m³) it will be possible to perform calibration of quite big-sized space equipment). The first series of prospective experimental works is to be devoted to absolute calibration of the equipment of the space solar patrol. The station is supposed to be commissioned in the first half of the year 2006.

The SR beamlines of both the stations have been made by a technology without windows. They are equipped with a fast closing system for the case of a vacuum damage at the station and with differential vacuum pump-down. That makes it possible to investigate unbreakable samples in the experimental spaces at an operational pressure up to 10^{-4} Pa. This report presents the optical schemes of both the stations, their main parameters and design photon flows for different operation regimes.

1. Krumrey M., Tegeler E., *Nuclear Instruments and Methods in Physics Research A*288 (1990) 114-118
2. Avakyan S., et al. *Sensors, Systems and Next Generation Satellites, Proc. SPIE*, v. 3870, pp. 451-461, 1999.

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