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The project of optical diagnostics of the beam dimensions of the storage with ultra-low emittance SKIF

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The SKIF, a fourth-generation synchrotron radiation source is being constructed in Russia. This installation has an ultra-low emittance, allowing for high beam intensity in various scientific and technological fields. A crucial aspect of SKIF is its availability of diagnostic instruments that measure the beam's transverse dimensions. This will allow for minimizing the emittance during operation and comparing it with a calculated value of 75 pmrad. *This comparison is critical for determining whether the physical setup meets the design specifications. In addition to measuring the transverse dimensions of the beam, it is also important to observe the behavior of the longitudinal profile and measure its parameters with good accuracy. The calculated emittance of 75 pmrad corresponds to vertical beam dimensions less than 8 microns at the radiation extraction sites.* As part of the working project, a diagnostic complex has been developed that includes a beam size monitor based on a double-slit interferometer. This monitor will provide interferometric measurements in both the visible and near ultraviolet ranges, using sigma-polarized SR. This will provide additional opportunities to verify the consistency of beam size measurement results. Observation and measurement of the longitudinal distribution of the beam will be carried out using mutually complementary devices, such as a streak camera and electron-optical dissector.

Footnotes

Funding Agency

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Yes

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