Development of Front-end Software for Beam Parameters Measurement for Indus-2 Electron Synchrotron

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Abstract

An electron synchrotron with high brilliance requires monitoring of the electron beam parameters continuously. The state of the machine may be identified by measuring the beam parameters like betatron tune, synchrotron tune, beam orbit, instabilities level etc. To measure the machine status for Indus-2, a synchrotron radiation source at RRCAT, Indore, India, an integrated measurement scheme has been developed. This work involves the design of six different measurement modules, interfacing the hardware to initialize the measurement and acquisition of the data from hardware into software. The software acquires the beam position and beam intensity data in time and frequency domains. Signal processing techniques like point invariant concatenation of acquired data, low pass filtering, curve fitting, multi-peak detection etc. are applied on the acquired data to measure the beam parameters simultaneously. With the development of this software, more than 800 parameters are monitored online and logged.

References

Index Terms

Computer Science
Software Engineering

Keywords

Betatron tune, synchrotron tune, beam lifetime, coupled bunch instability etc.