A.1: Status report on operation of Indus accelerators

Synchrotron radiation (SR) sources, Indus-1 and Indus-2, constituting a national facility, continued operation in round-the-clock mode and provided SR beam to users. The operational performance of the facility has been restored to pre-COVID-19 levels.

In the reported period, both the machines were operated smoothly following the prescribed safety procedures. Figures A.1.1 and A.1.2 show the typical user mode operation of Indus-1 and Indus-2, respectively. Two planned shutdowns of five and four days each were taken in the months of March 2022 and May 2022, respectively for preventive maintenance and upgradations in the subsystems of the machines. After successful installation of horizontal pinger magnet in December 2021, in which one eighth of Indus-2 ring was vented, regular operation of the machine for users at 130 mA beam current was restored within one month. However, in January 2022, the operation was affected for one week due to problem in Microtron (pre-injector) and its rectification.

During first six months of the year, the machines were operated in round-the-clock mode for 171 days. The beam availability in Indus-1 was 3502 hrs. (~20.5 hrs./day) and in Indus-2, it was 2708 hrs. (~15.8 hrs./day). This performance is in line with the performance during pre-COVID-19 periods.

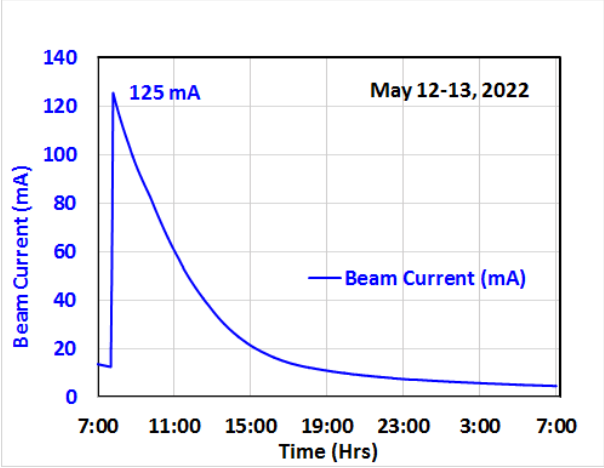

Fig. A.1.1: Typical user mode operation of Indus-1.

Utilization: A total of seven beamlines in Indus-1 and seventeen beamlines in Indus-2 are operational. Users from various universities, research institutes and national laboratories used the SR beam at beamlines in Indus-1 and Indus-2 for carrying out the experiments. The total number of user experiments carried out at Indus beamlines in the reported period of January to June 2022 was 474.

Machine studies: Ten days were reserved for experiments related to machine studies and improvements. Some of the experiments carried out in Indus-2 during these days are: (a) determining the alignment offsets of beam position monitors using beam based alignment (BBA)) technique, (b) testing and qualification of "auto pilot" software for automatic optimization of beam injection into Indus-2, (c) beam orbit and betatron tune correction during beam injection & beam energy ramping, and (d) observation and optimization of Indus-2 RF system parameters with beam. These experiments have greatly helped in analysis and performance improvement of Indus-2 and its sub-systems.

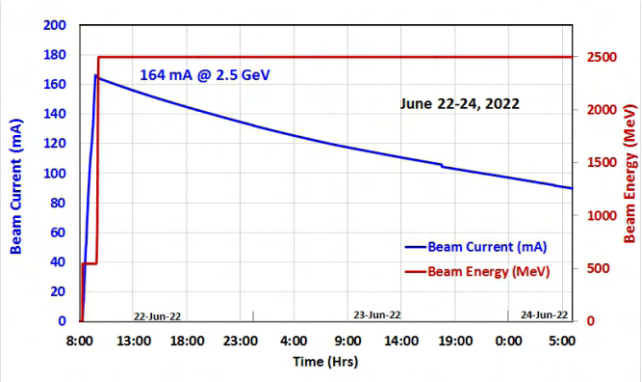

Fig. A.1.2: Typical user mode operation of Indus-2.

The Indus facility admitted under the qualification incentive scheme of the DAE: In April 2022, DAE issued office memorandum regarding inclusion of Indus synchrotron radiation facility under the qualification incentive scheme of the department. This is a recognition to the comprehensive training required for operation of the facility. Under this scheme, trained operation staff of Indus facility will start getting the qualification incentive as per the norms and guidelines of the scheme. This is an important milestone for the Indus national facility.

Renewal of licences/qualifications of operation staff: The licences/qualifications of 38 Indus operation staff personnel were renewed, as per procedure in the month of June 2022, through an interview by the respective committees. As per requirement, the licences and qualifications of the operation staff are to be renewed after every three years.

Reported by:
T. A. Puntambekar (tushar@rrcat.gov.in)