

Synchrotron radiation sources INDUS-1 and INDUS-2*

D D BHAWALKAR, G SINGH and R V NANDEDKAR

Centre for Advanced Technology, Indore 452 013, India

E-mail: gurnam@cat.cat.ernet.in

Abstract. The synchrotron radiation sources, INDUS-1 and INDUS-2 are electron storage rings of 450 MeV and 2 GeV beam energies respectively. INDUS-1 is designed to produce VUV radiation whereas INDUS-2 will be mainly used to produce x-rays. INDUS-1 is presently undergoing commissioning whereas INDUS-2 is under construction. Both these rings have a common injector system comprising of a microtron and a synchrotron. Basic design features of these sources and their injector system are discussed in this paper. The radiation beamlines to be set up on these sources are also described.

Keywords. Accelerators; synchrotron radiation; beam dynamics; x-rays; beamlines.

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1. Introduction

By late seventies, synchrotron radiation had already become well known as a powerful tool for basic and applied research in physics, chemistry, biology and medicine. Around that time, India also achieved a major milestone in accelerator technology when the 224 cm diameter Variable Energy Cyclotron built by the Bhabha Atomic Research Centre (BARC) at Calcutta became operational. Based on the experience gained in accelerator technology and considering the use of accelerators in various disciplines, the Department of Atomic Energy (DAE) appointed in 1979 a committee under the Chairmanship of Dr P K Iyengar, then Director, Physics Group, BARC to recommend a comprehensive long term programme to construct accelerators in India. After considerable deliberations, the committee recommended the construction of a synchrotron radiation facility in the first phase and a high energy proton accelerator in the second phase. This decision was based on the fact that a synchrotron radiation source will cater to the needs of a much larger and wider scientific community than a proton accelerator. In order to chalk out the specifications of the synchrotron radiation facility to be built, another committee headed by Mr C Ambasankaran, then Director, Variable Energy Cyclotron Centre and Electronics Group, BARC was constituted. This committee recommended that two synchrotron radiation sources one for vacuum ultraviolet radiation (VUV) and the other for x-rays should be built. After several discussions with potential users, it was decided to build two synchrotron radiation sources – first source, an electron storage ring of 450 MeV for the production of VUV radiation and the second one, a storage ring of 2 GeV energy for x-rays [1–4].

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