Newsletter

CENTRE FOR ADVANCED TECHNOLOGY

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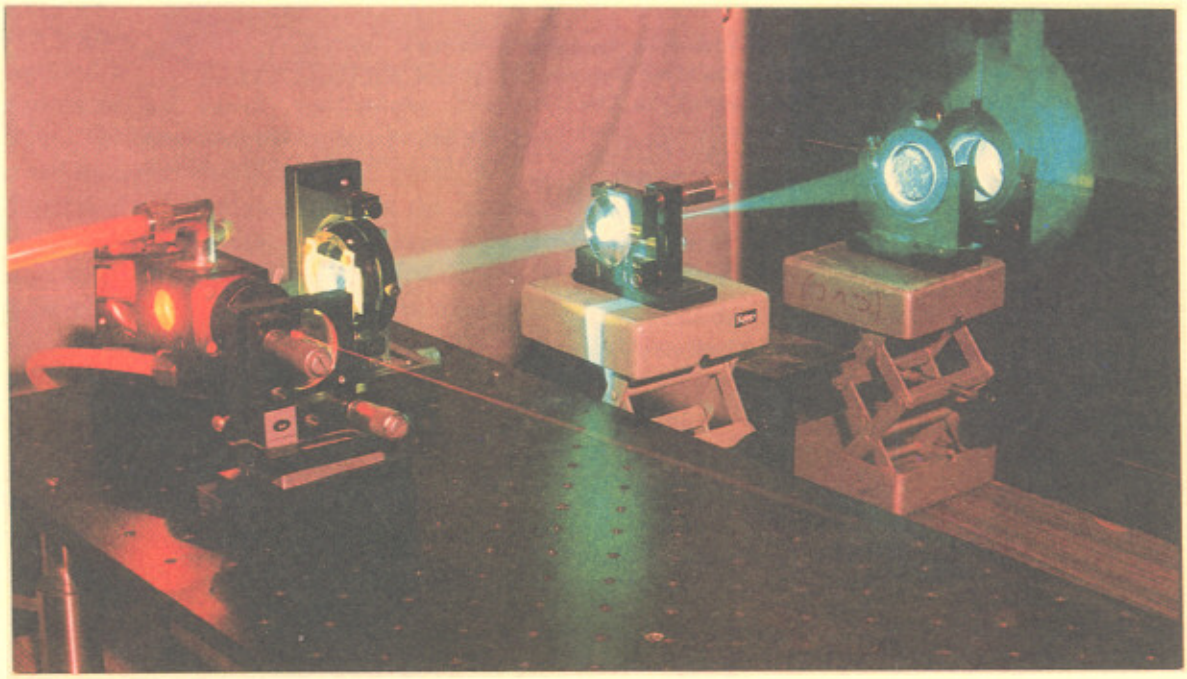

RESEARCH AND DEVELOPMENT

ACCELERATOR PROGRAMME

Beam Monitors for Microtron

Trials to extract the electron beam at full energy from the 20 MeV microtron are in progress. The next step will be to measure the parameters of the extracted beam such as emittance, energy spread and current, and optimize them for injection into the booster synchrotron. To facilitate these tasks, three beam monitors viz. internal beam probe, beam profile monitor and Faraday cup have been developed.

The internal beam probe is a water cooled copper rod with a cylindrical disk at its one end that can be moved radially inside the microtron chamber. For measurement of beam current on an orbit, the probe is moved to that orbit to intercept the beam. Salient design features of the probe include a microwave shielding and a special geometry to eliminate the contribution of a single orbit more than once during the probe insertion cycle.

The beam profile monitor has a phosphor screen of AR 995R alumina which is inserted into the path of the extracted beam using a stepper motor. The spot of flourescent light produced by the beam is viewed by a CCD camera and the image is displayed on a TV monitor located in the

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DEPARTMENT OF ATOMIC ENERGY

May 31, 1993

M E S S A G E

The Centre for Advanced Technology (CAT), in the last nine years has been spearheading successfully the national effort in Research and Development in the frontier technology areas of accelerators and lasers and also related areas. I congratulate all the employees of CAT for their valuable contributions which has made this possible.

I am sure CAT would continue to function with the same vigour and scale even greater heights of achievements in the years to come.

One of our important mandates is to make scientific information available to the public in lucid language. I am happy to note that the News Letter of CAT has been fulfilling this task commendably.

My felicitations to the editorial staff and best wishes for their continued success.

R. Chidambaram

(R. Chidambaram)
Chairman, AEC &
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control room. Due to low repetition rate (1-2 Hz) of the microtron beam bunches it is difficult to view the real time image. This problem has been overcome by using a video frame grabber discussed later in this newsletter.

The Faraday cup is used for absolute measurement of the extracted beam current. It consists of a graphite absorber which captures the electrons. The abosrber has a re-entrant geometry followed by a lead backing and is surrounded by a vacuum envelope.

The monitors have been tested under simulated beam conditions and have been installed in the experimental setup for the beam extraction trials. The photograph shows this experimental setup with a beam profile monitor and a Faraday cup in the path of the external beam of the 20 MeV microtron. The internal probe, being inside the chamber, is not seen in the photograph. After beam extraction at 20 MeV, a transfer line with a provision to measure the beam emittance and energy spread will be set up.

Video Frame Grabber

A video frame grabber has been made at CAT with the help of the technology developed at BARC. As mentioned above, this is used with the beam profile monitor for capturing the image of the microtron beam repeating at 1-2 Hz. The image thus captured can be seen on a TV monitor and can also be sent to a computer for analysis.