Use in the ISR

The Induced Radioactivity Monitor system was designed in order to reduce the time involved in radiation surveys along the vacuum chamber in the Intersecting Storage Rings (ISR) and transfer tunnel complex. Such a survey is carried out after each ISR operation period to determine the radiation levels from induced radioactivity.

The detector system is based upon 172 GM counters inside the ISR complex, connected to a carryplex cable, and transmits the signals to the Health Physics surveyors' office. The count rate can either be graphically displayed for 20 counters on five four-point recorders, or printed out for all monitors when using the Argus 500 computer of the ISR control room. This print-out also provides a list of dose levels and validity data in a numerical and a graphical way. The signal from the monitor system will indicate to the radiation protection technician those areas where high dose levels exist.

By the use of carryplex transmitters and receivers the cabling becomes extremely simple, and monitors can easily be moved from one place to another without recabling. The signals from the different monitors can simultaneously be transmitted via one common coaxial cable to the control room. The power which the monitors require is distributed by the same cable. The physical size of the monitor is small, and each monitor is equipped with a special bracket, which enables easy mounting on the cable trays in the ISR ring.

The 600 V required by the Geiger counter are obtained from the 30 V carryplex line, using a d.c./d.c. converter. Pulses from the counter drive a transmitter via a pre-scaler. In the control room, receivers transfer the signal from the monitors to a computer. The information from some of the monitors can be observed graphically in a 20-channel digital-to-analog recording device. The dynamic range of the monitor system is 0.03 to 90 mrad/h.
The ISR Induced Radioactivity Monitor System has been described in detail in a paper entitled "A monitoring system for measuring the dose-rate from induced activity in high-energy accelerators" in the Proceedings of the International Congress on Protection against Accelerator and Space Radiation [CERN 71-16 (1971), Vol. 2, pp. 935 and 966].

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