

Optoelectronic developments for remote-handled maintenance tasks in ITER

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Periodic maintenance operations during shut down of the future International Thermonuclear Experimental Reactor (ITER) will have to be performed in a severe nuclear environment, exposing operating tools inside the reactor vessel to temperatures ranging from 50°C to 200°C, with total doses that can reach MGy levels. Radiation tolerant remote-handling technology will therefore play a major role during these maintenance tasks. Connecting remotely operated actuators and sensors with the control room requires bulky and shielded umbilicals. Their management could be eased by applying radiation tolerant communication links with multiplexing capabilities, for which fibre-optic technology is considered as a potential EMI-free solution. We present the main results obtained at SCK•CEN over the past years towards the development of radiation tolerant fibre-optic communication links, including the individual optical components such as optical fibres and power couplers, laser diodes and photodetectors, as well as their associated electronic driver circuits.

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