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Development of high-power IOTs as an efficient alternative to klystrons

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The European Spallation Source ESS is a 2 GeV, 5 MW proton accelerator being designed with the start of construction planned for 2014 in Lund, Sweden.

ESS is to provide a sustainable large-scale research facility. As such, ESS is focusing on reducing energy consumption by the use of high efficiency devices and by recovering waste heat. The largest section of the ESS linac, the high beta section requires 88 RF sources with a pulsed power requirement of around 1.1 MW plus a power overhead for cavity field regulation. Traditionally, at the ESS frequency of 704 MHz, the typical choice would be to use large klystrons. However the use of IOTs will deliver certain advantages to the operation of ESS including higher efficiency at the operating point, cheaper modulators and a more compact design and layout. This talk will describe a proposed multi-beam 1.2 MW IOT development to be sponsored and supported by ESS in collaboration with CERN.

Presenter: Dr JENSEN, Morten (ESS)

Session Classification: Energy Efficiency at Research Infrastructures