

## Controls architecture challenges for beam dump kickers

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The FCC Beam Dump architecture will be a configuration with a high amount of kicker magnets, even though a final FCC Beam Dump architecture has not yet been decided upon. One of the concepts being studied is the use of 300 kicker magnets to safely extract and dilute the beam onto an external absorber block. Independently of the exact extraction scheme and geometry, it is already clear that the existing kicker controls architecture used at CERN has to be revised in order to cover the FCC's challenging technical and operational requirements.

Based on a proposed magnetic field rise-time of around 1  $\mu\text{s}$  and on the prerequisite that a spontaneous firing of one generator should not result in immediate beam loss, the extraction kicker design has yielded to a magnet length of around 35 cm which needs to be pulsed with 7kA. The stringent field rise time and magnet impedance parameters will constrain the length of the transmission line and this will possibly entail a higher radiation dose for the power pulse generator and its control electronics. Additionally the short magnet length and the need to fit all magnets in a 120 m long straight section requires more compact and integrated solutions. Full redundancy, high availability and maintainability will be critical parameters because of the limited accessibility to the equipment during operation. Controls architectures taking into account the main challenges, being triggering, retriggering, integration, reliability and availability, will be discussed in this paper.

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