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# M1Po2C-10 [43]: Magnetic Modelling of Fields and Losses in Fast Switching, Polarizing, Superconducting Undulators

*Monday 22 July 2019 14:00 (2 hours)*

We have magnetically modelled a fast switching, polarizing, superconducting undulator. The particular design is called the SuperConducting Arbitrarily Po-larizing Emitter, or SCAPE, It has a four jaw design, and produces LCP, RCP, L-H and L-V polarization states. This design uses a dual SC undulator scheme to achieve fast switching. Each undulator is preset to generate a fixed polarization state and a small (alternating) current bump in each of the devices is used to actuate switching. The undulator period is 30 mm, the beam ID is 6 mm, and the peak field is 1 T, with a coil Je of 1200 A/mm2. The energization of the system has both AC and DC components, such that the strands experience a main DC field and a small AC cyclic field. Frequencies from a few Hz to hundreds of Hz are of interest. The present design for SCAPE uses low loss NbTi strands. We have used a combination of FEM modelling (of the undulator) and analytic modelling (of the strand) to make AC loss estimates as a function of frequency. We have also explored Nb3Sn conductors for this design, using fine filament, low loss conductors. We compare losses for these two implementations over a range of frequencies

**Primary authors:** MAJOROS, Milan (The Ohio State University); MICHAEL SUMPTION (FOR ICMC); Prof. COLLINGS, Ted (MSE, OSU); Dr KESGIN, Ibrahim (Argonne National Laboratory); Dr IVANYUSHENKOV, Yury (Argonne National Laboratory)

**Presenter:** MAJOROS, Milan (The Ohio State University)

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