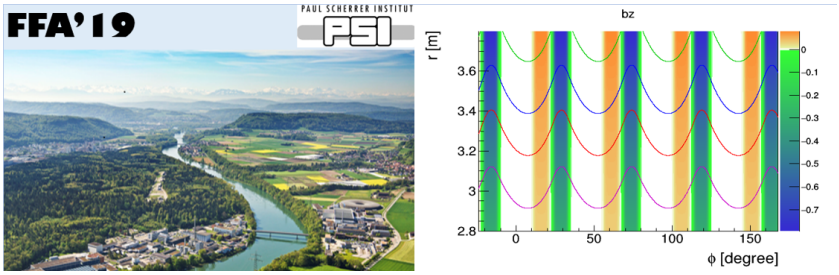

Contribution ID: **19** Type: **not specified**

A 2-8 GeV Fixed-field, Transition-less, Transition-less Synchrotron*

Wednesday 20 November 2019 14:00 (45 minutes)

Rapid cycling synchrotrons are limited in duty cycle from ramped magnetic fields, with 50-60Hz the current or practical technical state of the art. To achieve a higher cycling rate requires fixed magnetic fields. A strong-focusing proton synchrotron with fixed magnetic fields and swept-frequency RF (53 MHz at extraction) has been proposed to replace the present 8 GeV Fermilab Booster synchrotron to accommodate the high current and increased energy in the PIP II era and plan for the PIP III phase at Fermilab. A conceptual fixed-field synchrotron design is presented using a nonlinear gradient, nonscaling FFA approach. The radial field profile will be optimized to provide strong-focusing, constant synchrotron tunes over the acceleration range from 2-8 GeV in a 24-sector machine with 24 10-meter straight sections to accommodate injection and ferrite RF cavities. The extraction radius is constrained to 513 meters in circumference to match to the Fermilab Main Injector which accelerates 8 GeV protons to 120 GeV.

*Work supported by Fermi Research Alliance, LLC under contract no. DE-AC02-07CH11359

Author: Dr JOHNSTONE, Carol (Fermilab)

Co-authors: PELLICO, William (Fermilab); Dr TAN, cheng-Yang (Fermilab)

Presenter: Dr JOHNSTONE, Carol (Fermilab)

Session Classification: Future / New Designs and Applications