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## Surrogate Models for Particle Accelerators

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Precise accelerator simulations are powerful tools in the design and optimization of existing and new charged particle accelerators. We all know from experience, the computational burden of precise simulations often limits their use in practice. This becomes a real hurdle when requiring real time computation. I will demonstrate two techniques, based on Polynomial Chaos Expansion [1] and Deep Neural Networks [2] that hints a path forward, towards precise real time computing. The examples will be based on linear accelerators and cyclotrons.

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