

PROTON BEAM DYNAMICS OF THE SARAF LINAC

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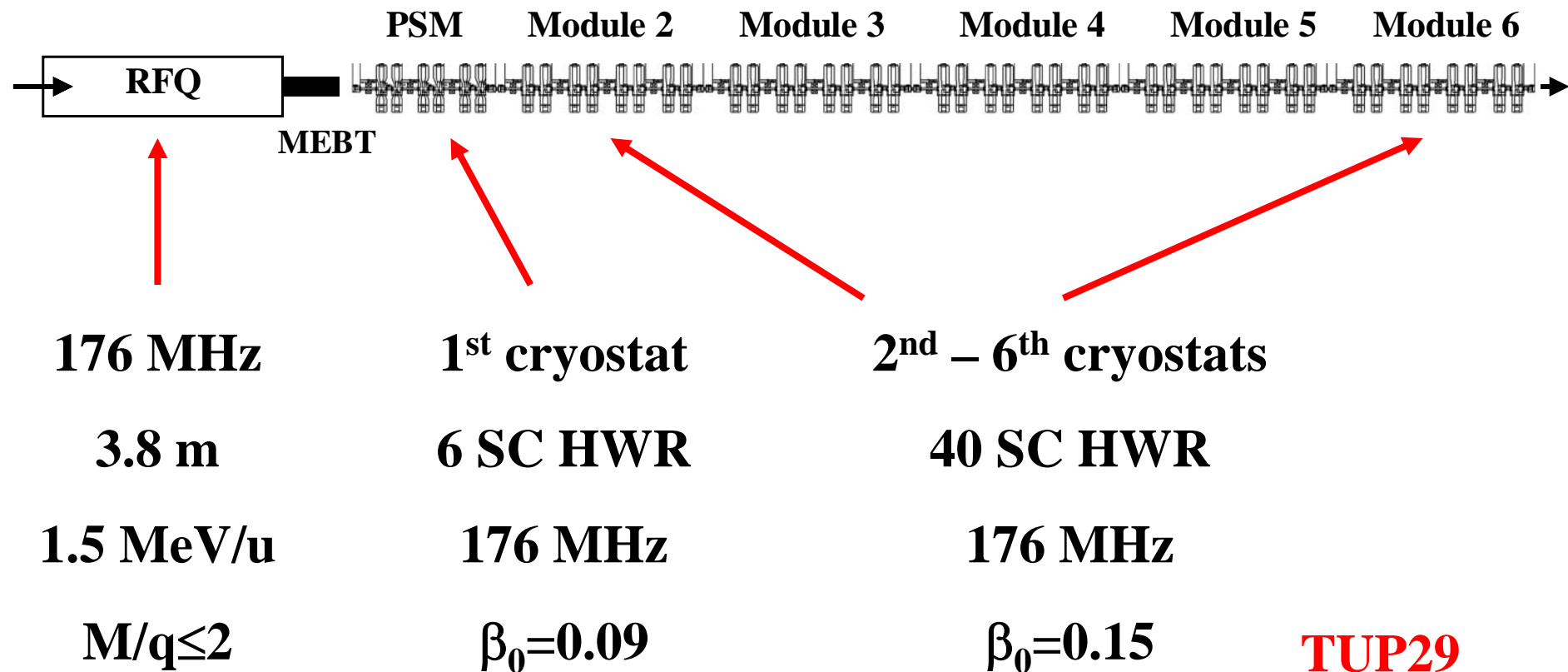
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SARAF

Soreq Applied Research Accelerator Facility

40 MeV x 2 mA p / d RF SC linac

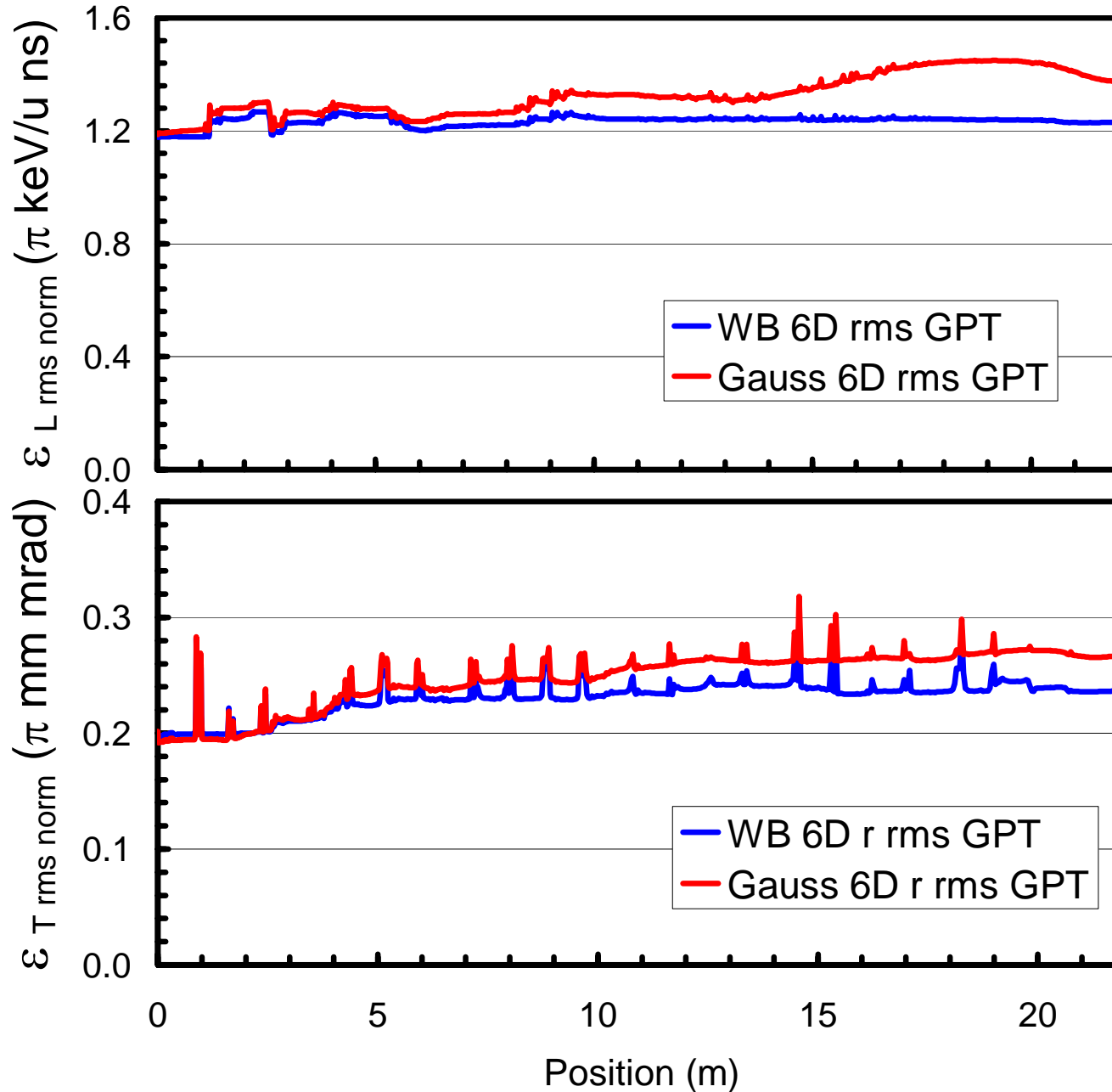


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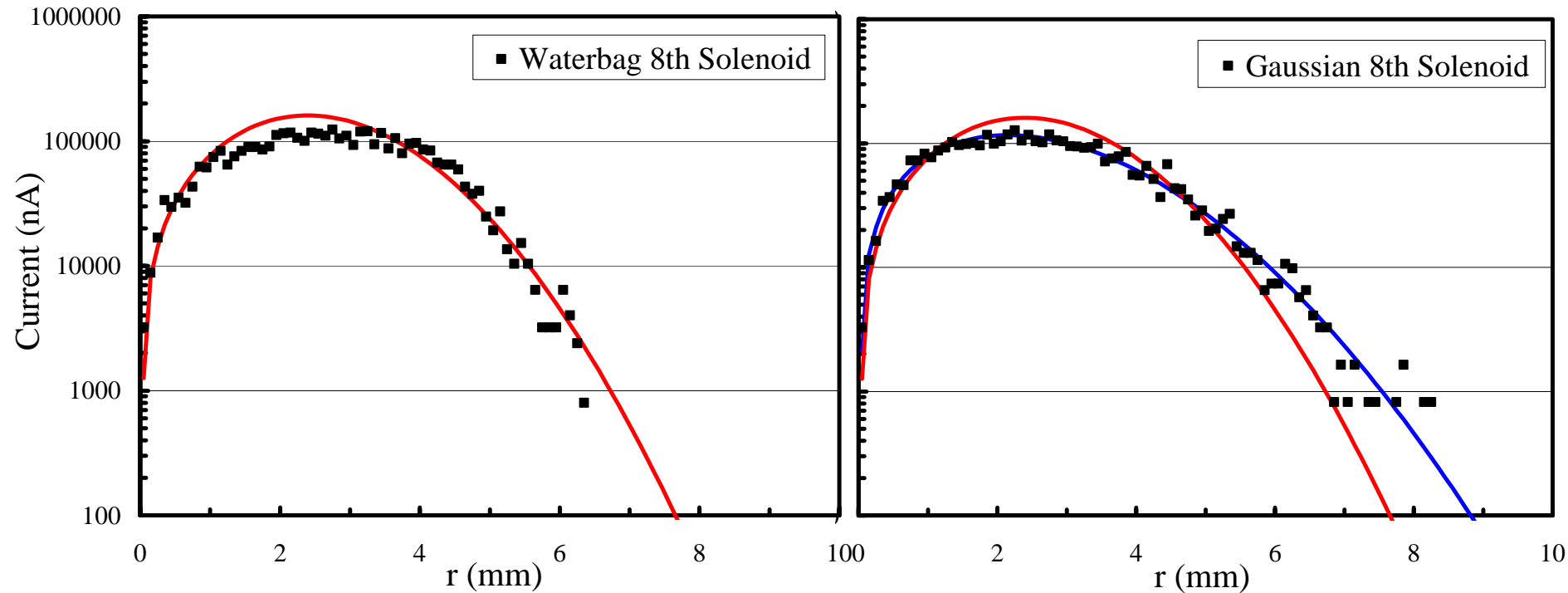
Scope of the paper

1. General Particle Tracer (GPT) ion linac simulation
2. An initial 6D Gaussian distribution
3. Rough beam loss predication by analytical extrapolation
4. Benchmark simulation with PARMELA and LANA

Beam quality along the linac

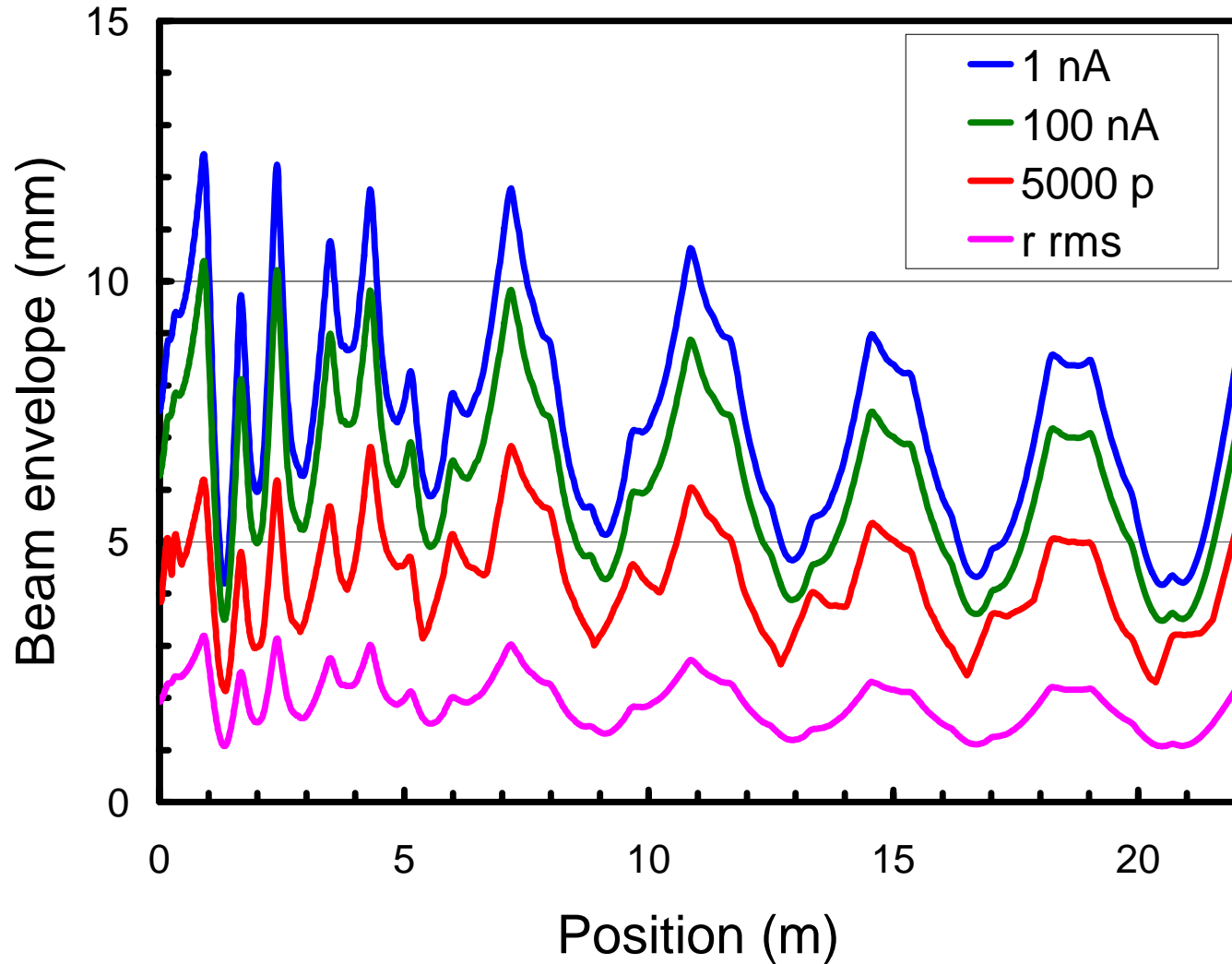


Particle distribution probability function at 8th solenoid



$$\Delta I = k \cdot \frac{r}{\sigma^2} \cdot e^{\left(-\frac{(r-r_1)^2}{2\sigma^2}\right)} \cdot \Delta r$$

Rough beam loss prediction



$$\frac{I_{loss}}{I_0} = \exp\left(-\frac{R^2}{2\sigma^2}\right) \quad \text{and} \quad \sigma = \frac{r_{rms}}{\sqrt{2}} \quad \frac{1nA}{4mA} = 2.5 \cdot 10^{-7} \quad \Rightarrow R = 5.5\sigma$$

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