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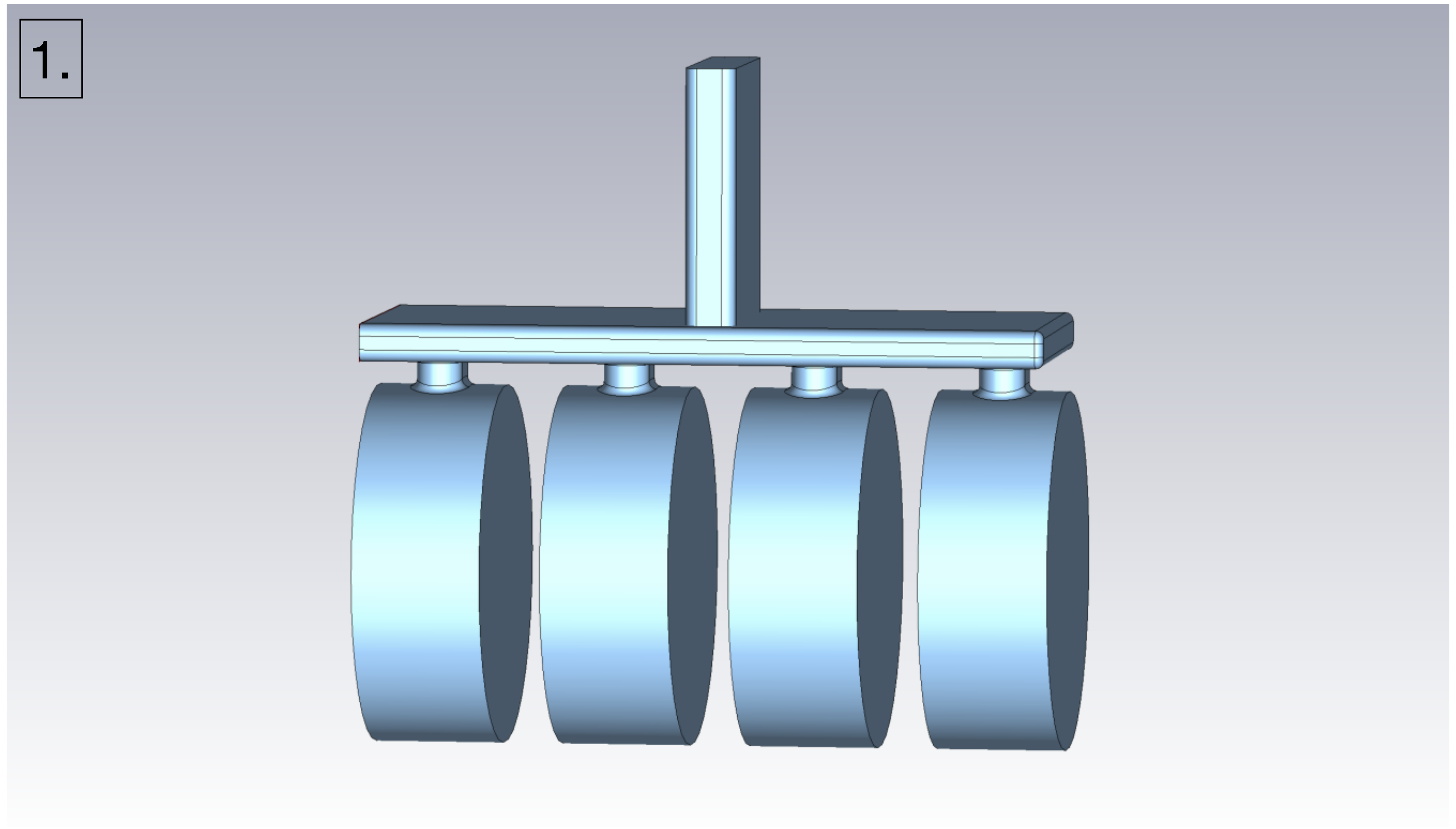
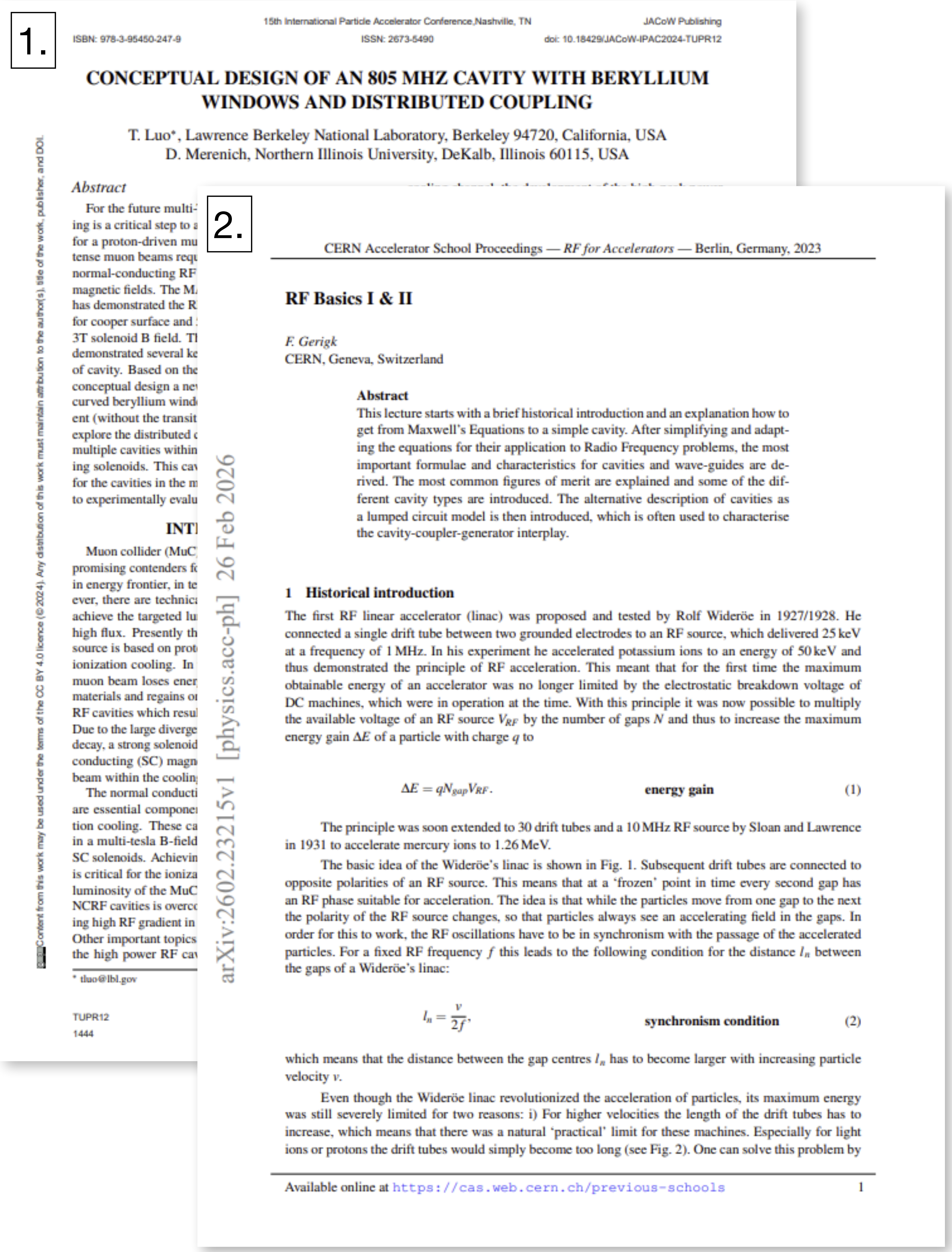
Exposition





1. Conceptual Design of an 805MHz Cavity with Beryllium Windows and Distributed Coupling

2. RF Basics I & II

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Study of the pillbox cavity

Frequency	Radius	Length	β	κ	U
805MHz	142.65mm	100mm	0.9	58MS/m	1J

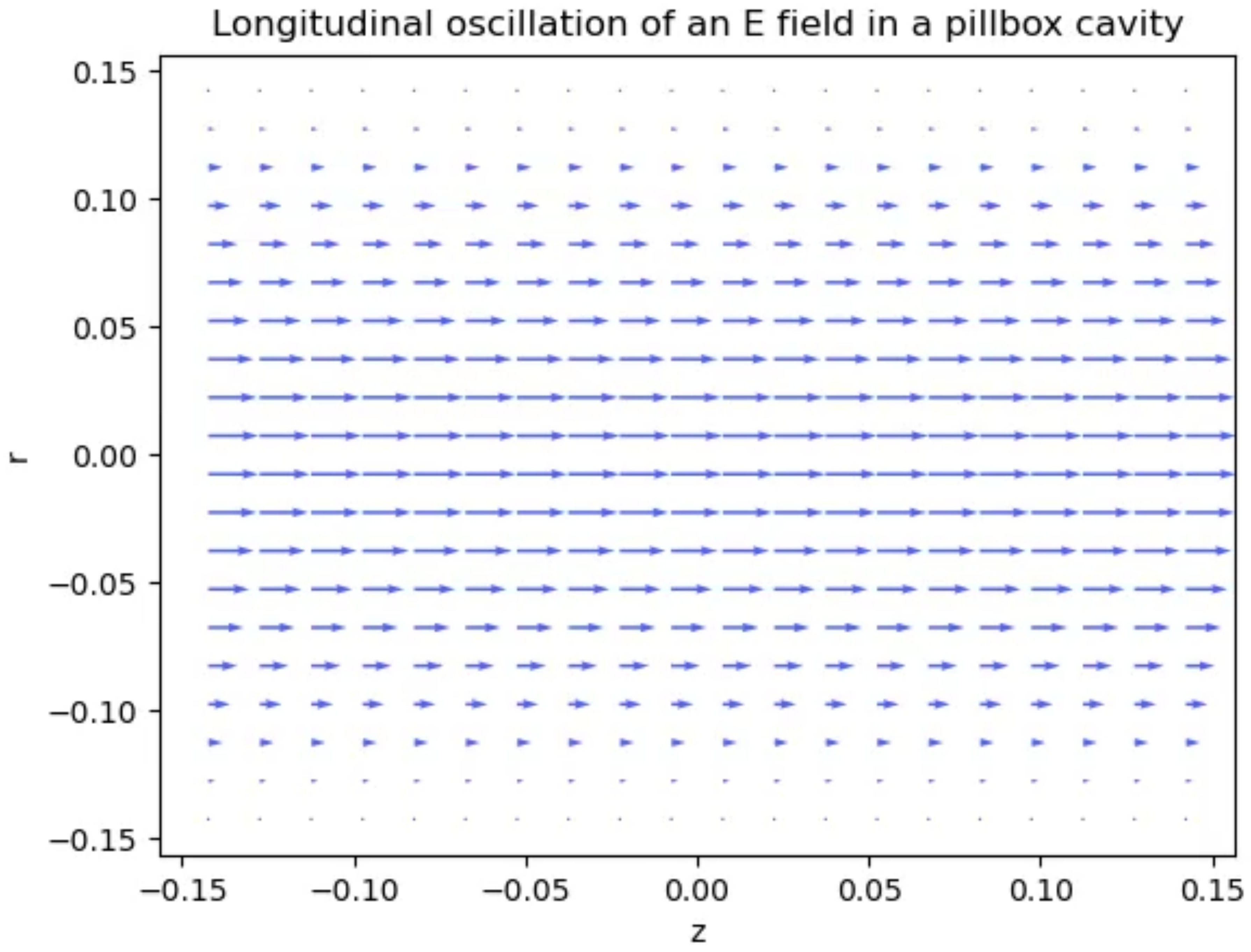
Result type	Transitive time	Q_0	RT^2/L	R/Q	Dissipated power
Analytical	0.861	2.57e4	5.0e4	192.94	1.97e5
CST	0.861	2.51e4	4.85e4	192.90	2e5

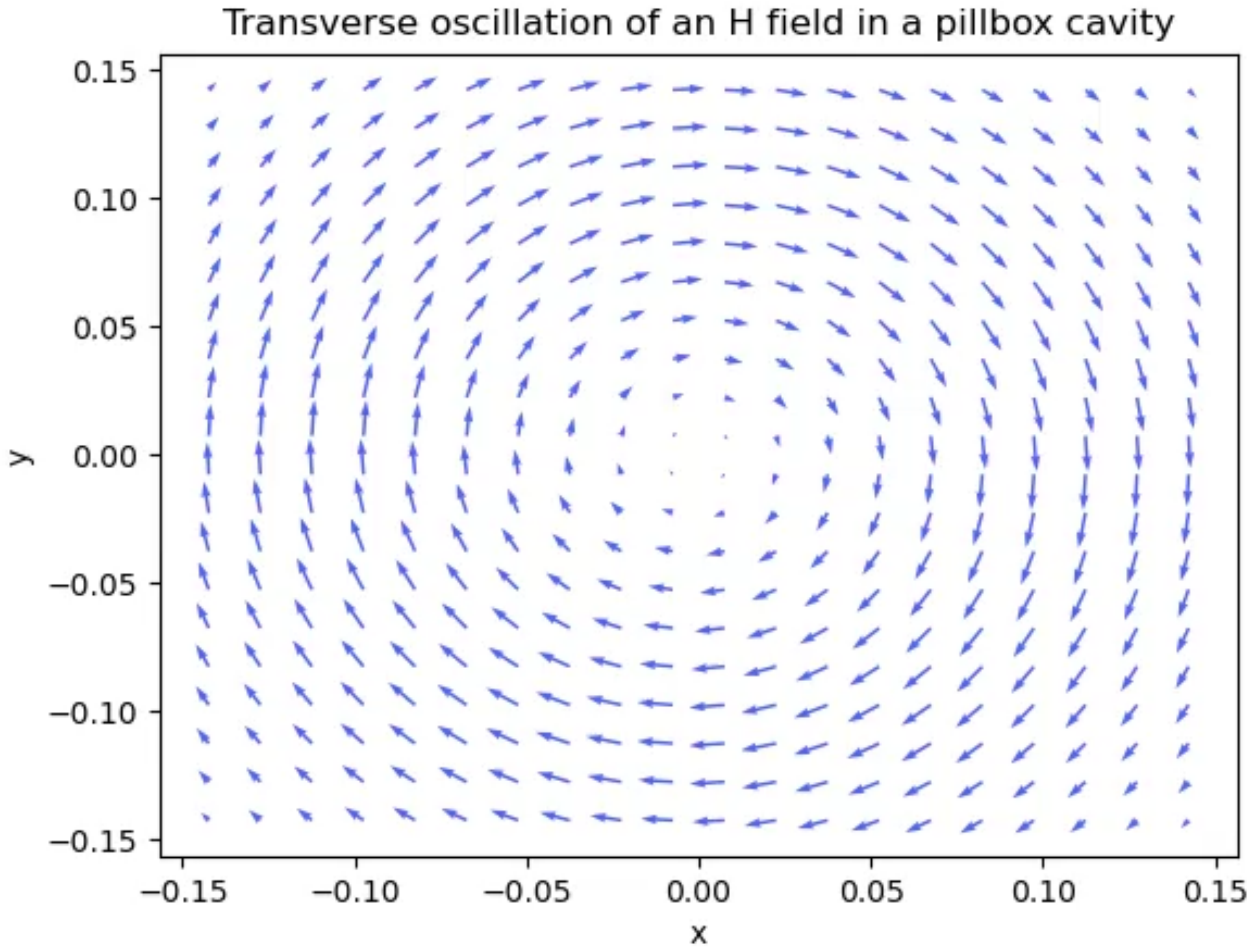
Frequency of the TM — 010 mode:

$$f_{010}^{TM} = \frac{j_{01}c}{2\pi a} \approx \frac{2.405c}{2\pi a}$$

Effective shunt impedance per unit length:

$$R = \frac{(V_0 T)^2}{P_d L}$$





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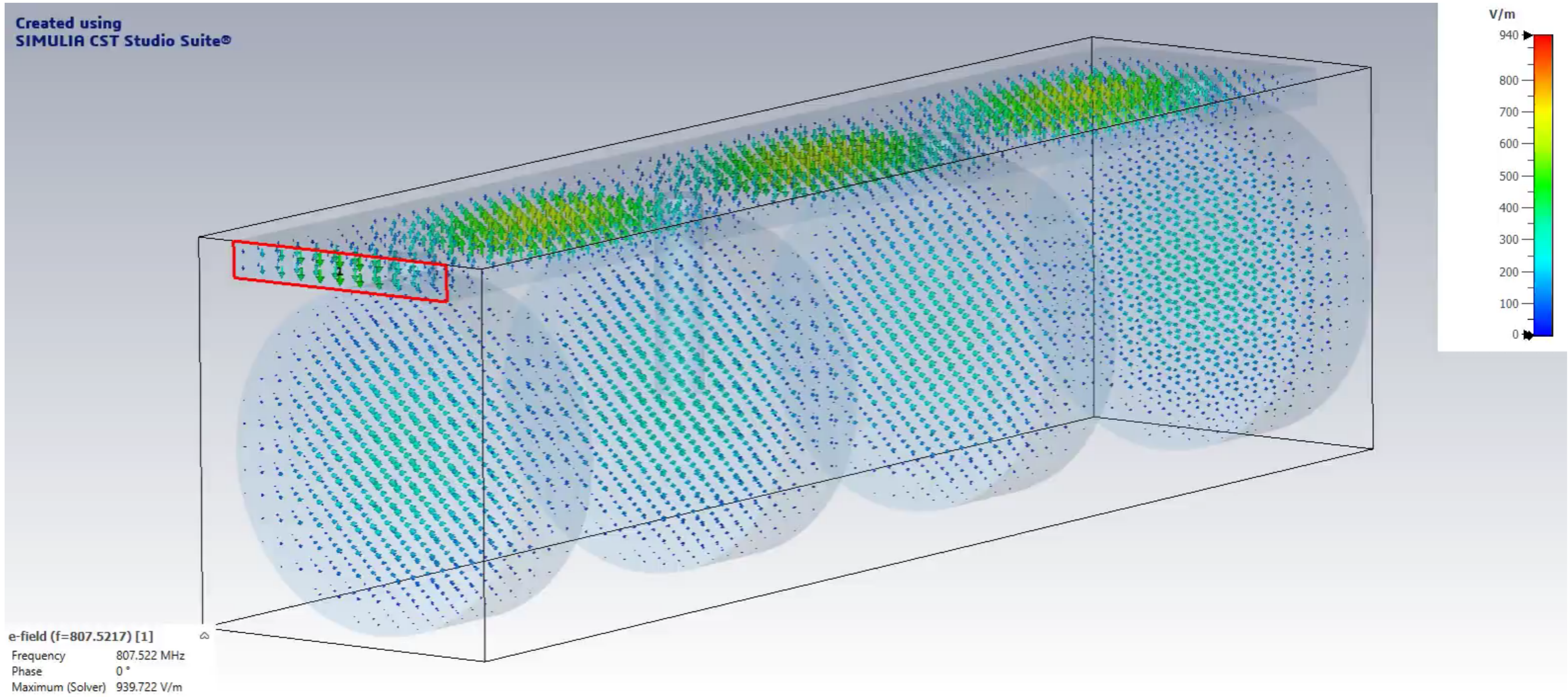
Cutoff frequency	TE_{02} mode frequency	a
700.475MHz	1400.96MHz	142.65mm

Implementing a rectangular waveguide



Phase and spacing of cavities:

$$\Delta l = \frac{v}{f_0}$$

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Next steps

- Start exploring alternative waveguide geometries!
- Optimize couplers for $\beta = \frac{Q_{ex}}{Q_0} \approx 1$
- Look at more complex cavities