



Extension of the application range of the State-Space Concatenation Scheme

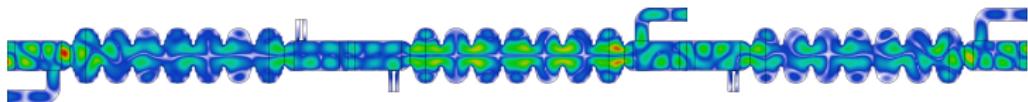
J. Heller and U. van Rienen

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The State-Space Concatenation scheme

- The State-Space Concatenation scheme (SSC) is a domain-decomposition method in combination with Model-Order Reduction for solving Helmholtz-equation
- Being used by UROS for various structures¹, e.g. bERLinPro



- Furthermore possible: Wakefields, frequency and time-domain excitations, external quality factors

¹ e.g. FLASH Third-Harmonic Module, BESSY^{VSR}, bERLinPro, European XFEL and some preliminary studies for MESA and FCC



Future applications

- We would like extend the **usage** of SSC within possible collaborations in:
 - Design studies, Modal Atlases, identification of dangerous modes
- Furthermore we would like to extend the **application range** of SSC to the interaction of charged particles with RF-fields

$$\nabla \times \nabla \times \mathbf{E}(\mathbf{r}, t) - \epsilon\mu \frac{\partial^2}{\partial t^2} \mathbf{E}(\mathbf{r}, t) = -\mu \frac{\partial}{\partial t} \mathbf{J}(\mathbf{r}, t)$$

- SSC might be useful to effectively compute **multipacting problems**
- Multipacting in SRF-Guns or HOM-couplers, possible combination with design studies