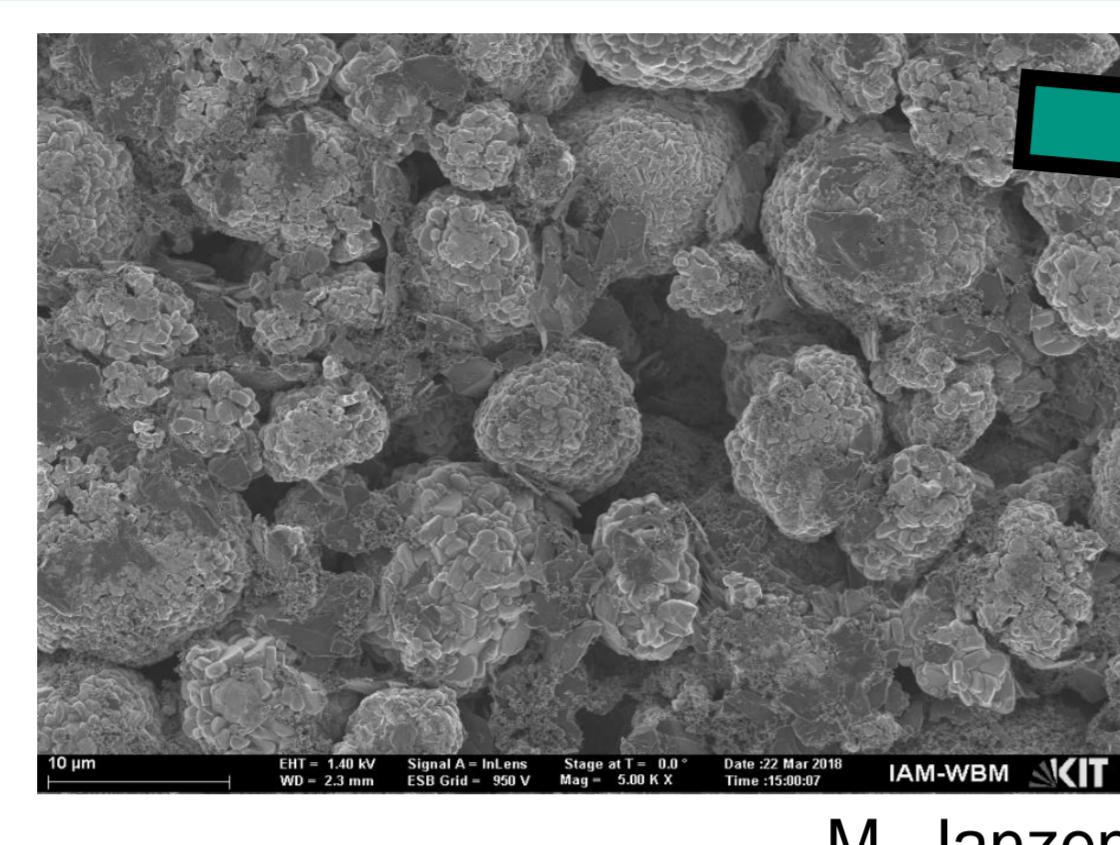


Particle based computation of mechanics in granular multiphase electrodes

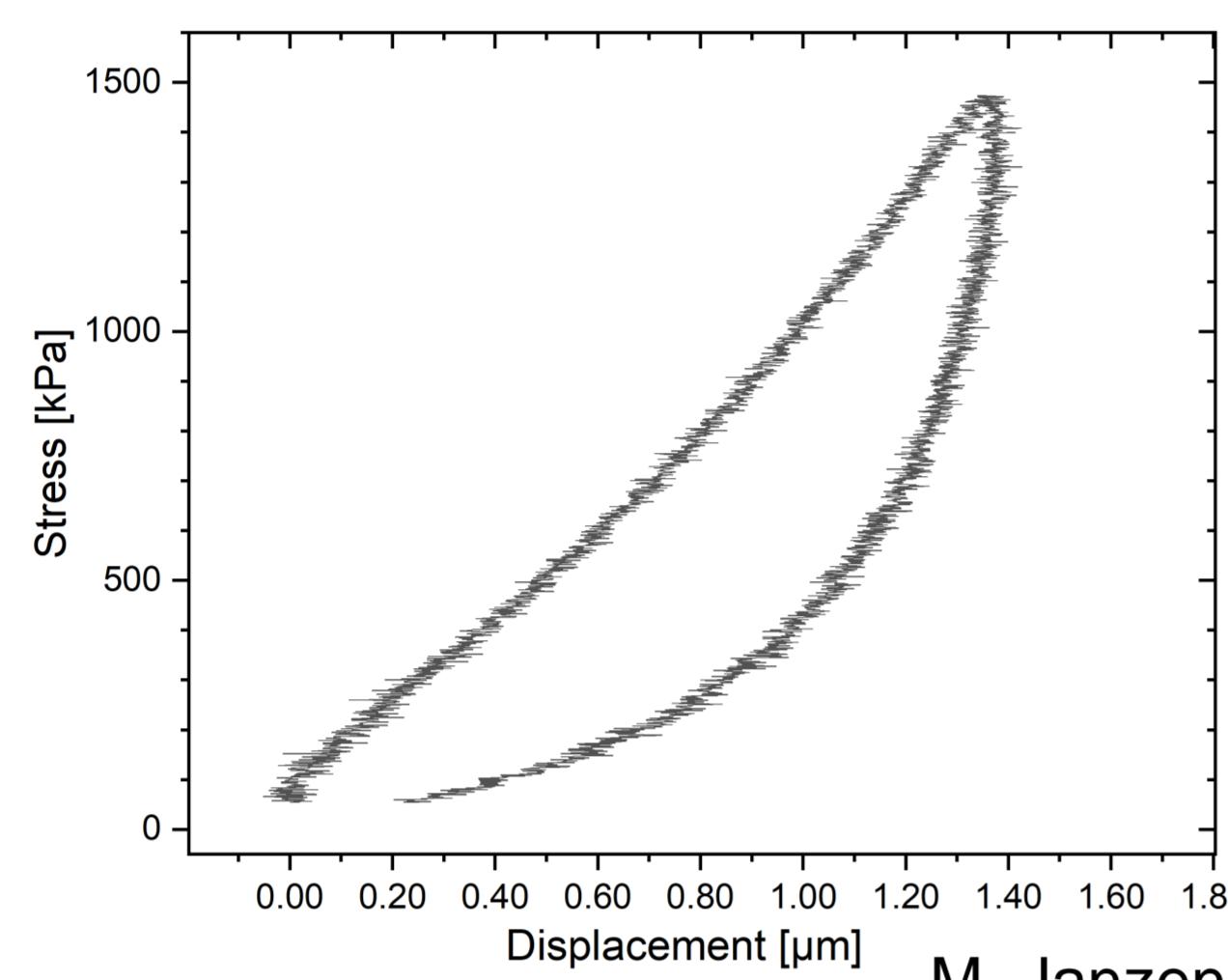
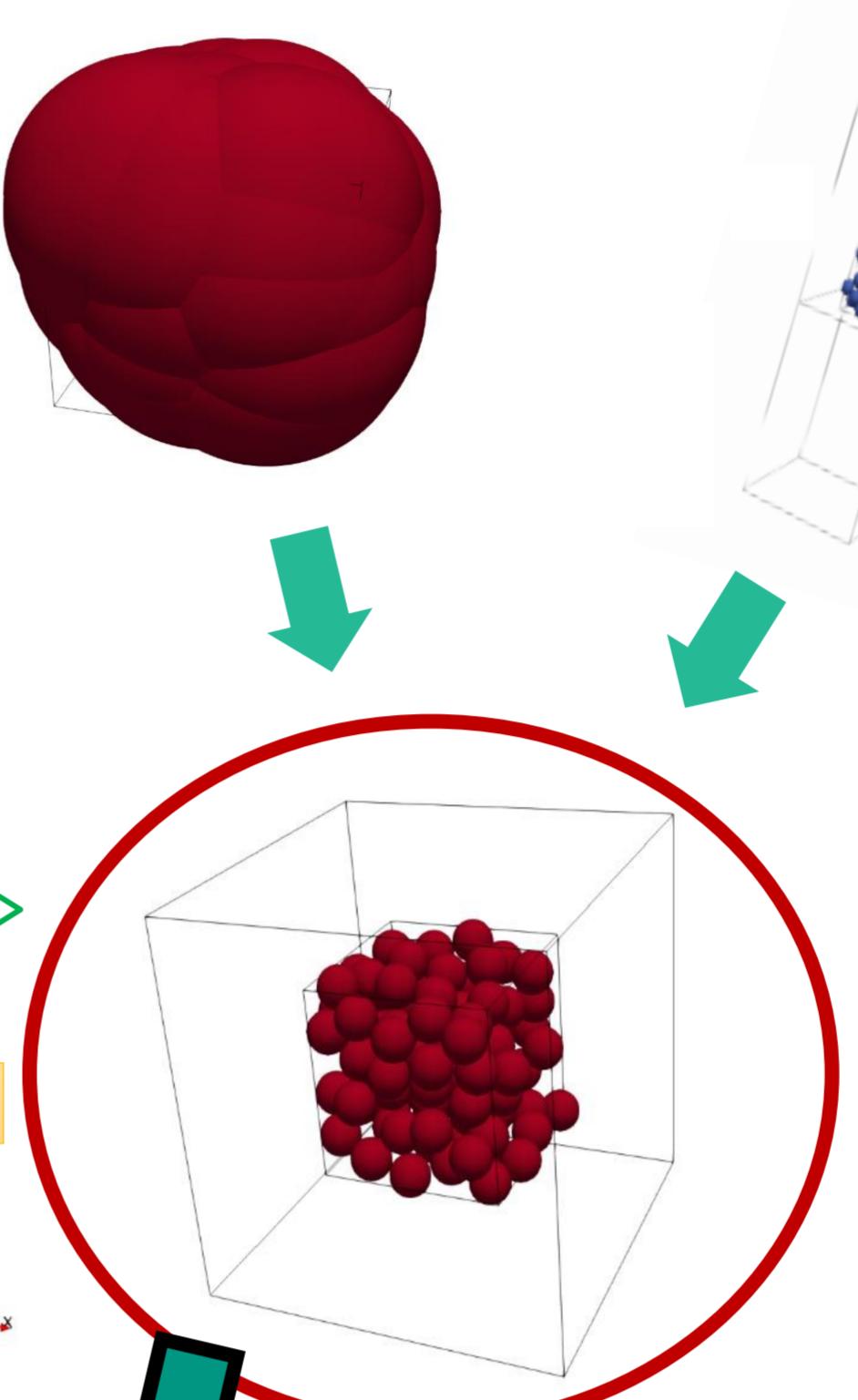
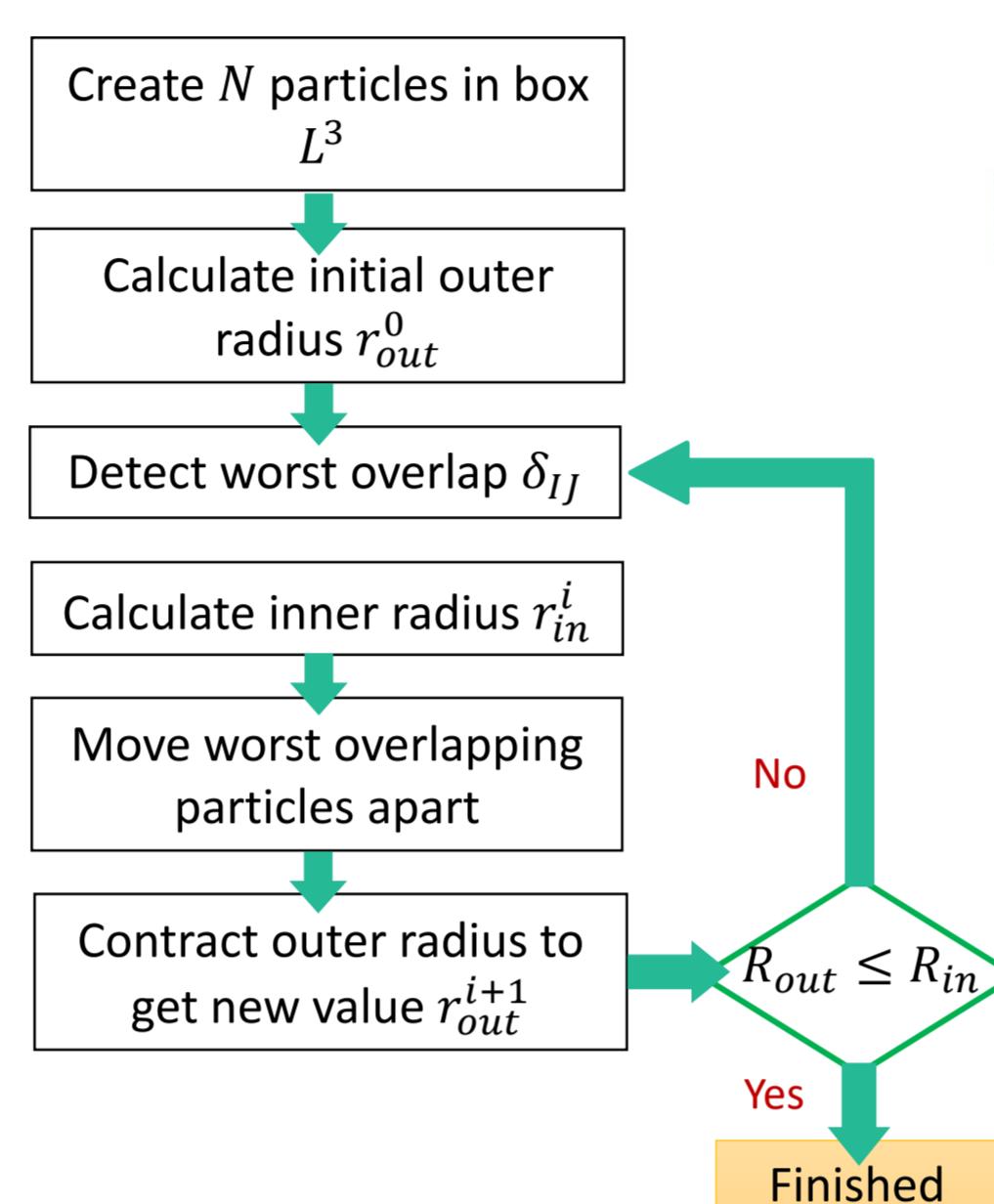
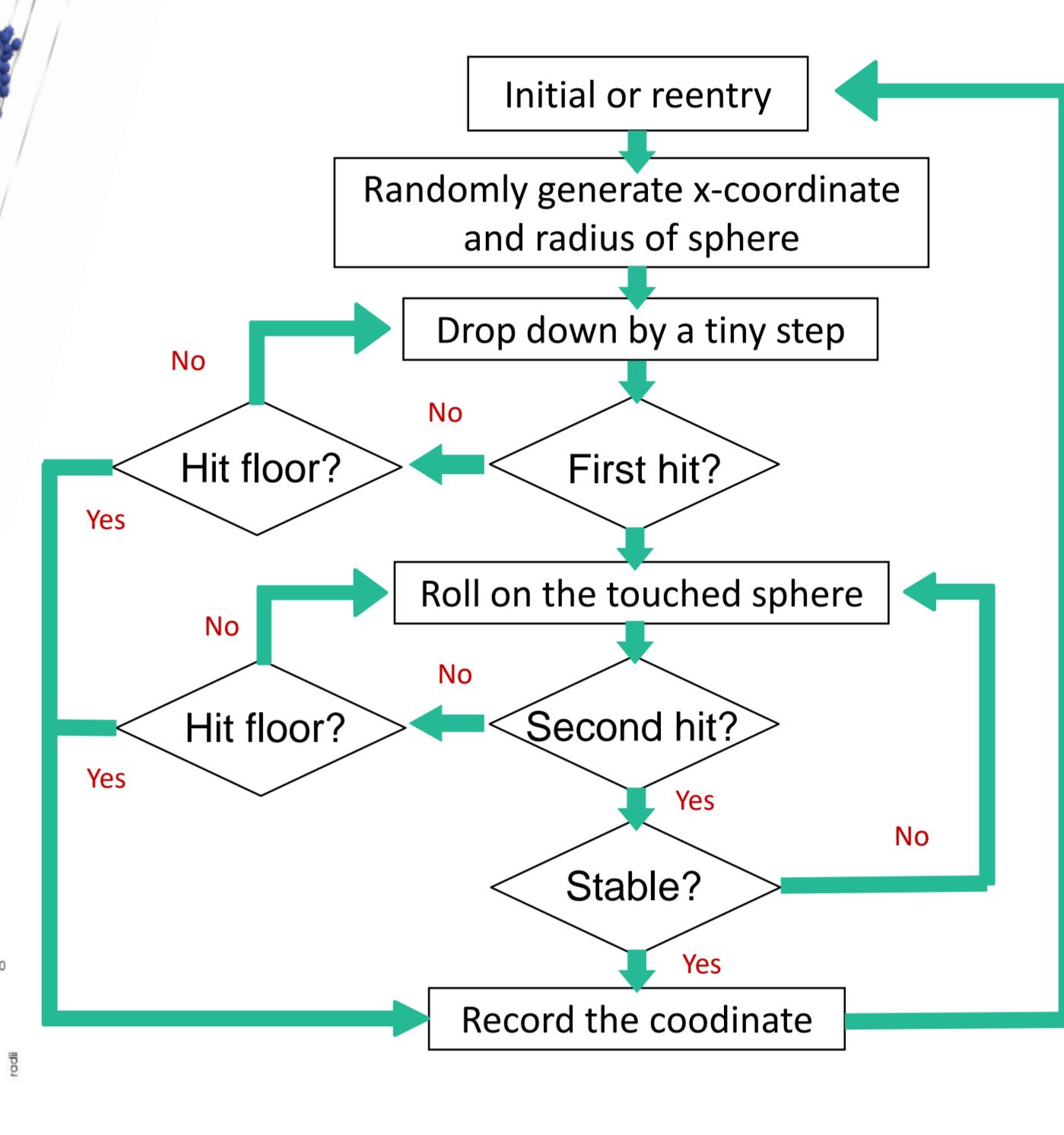
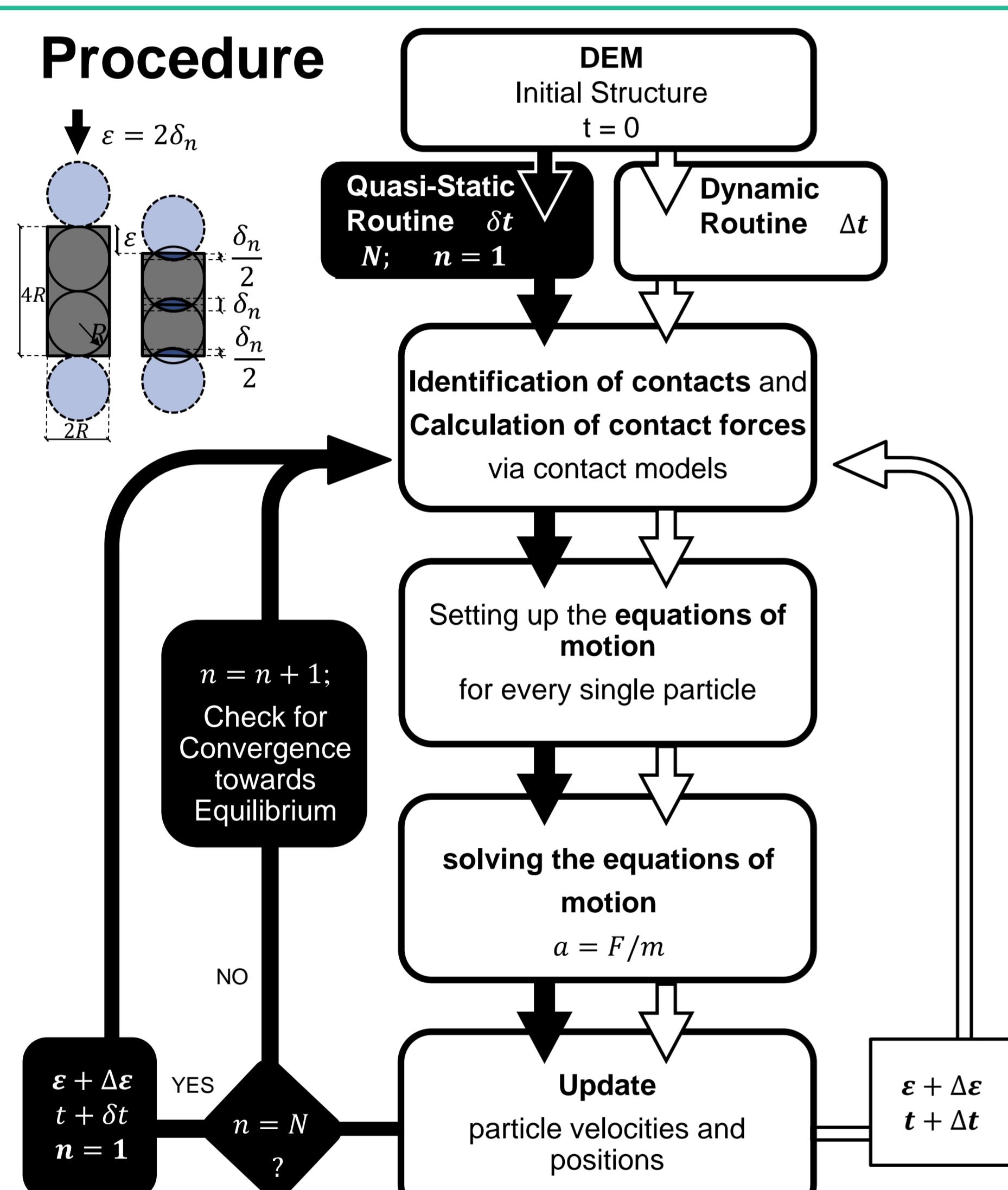
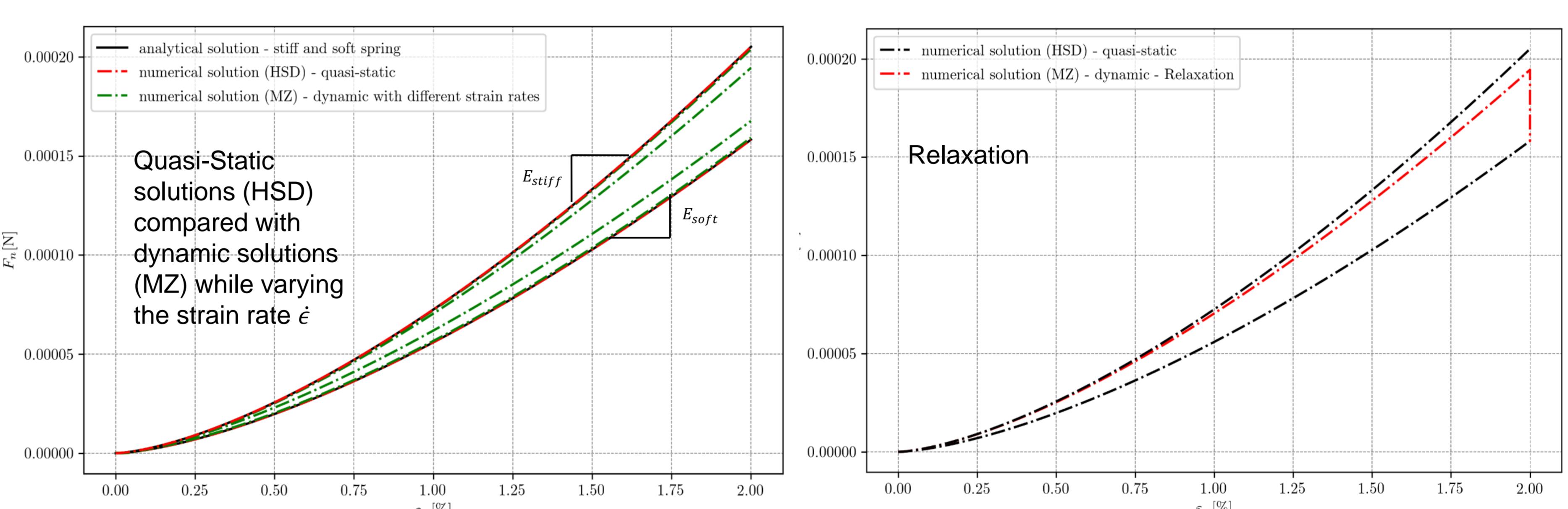
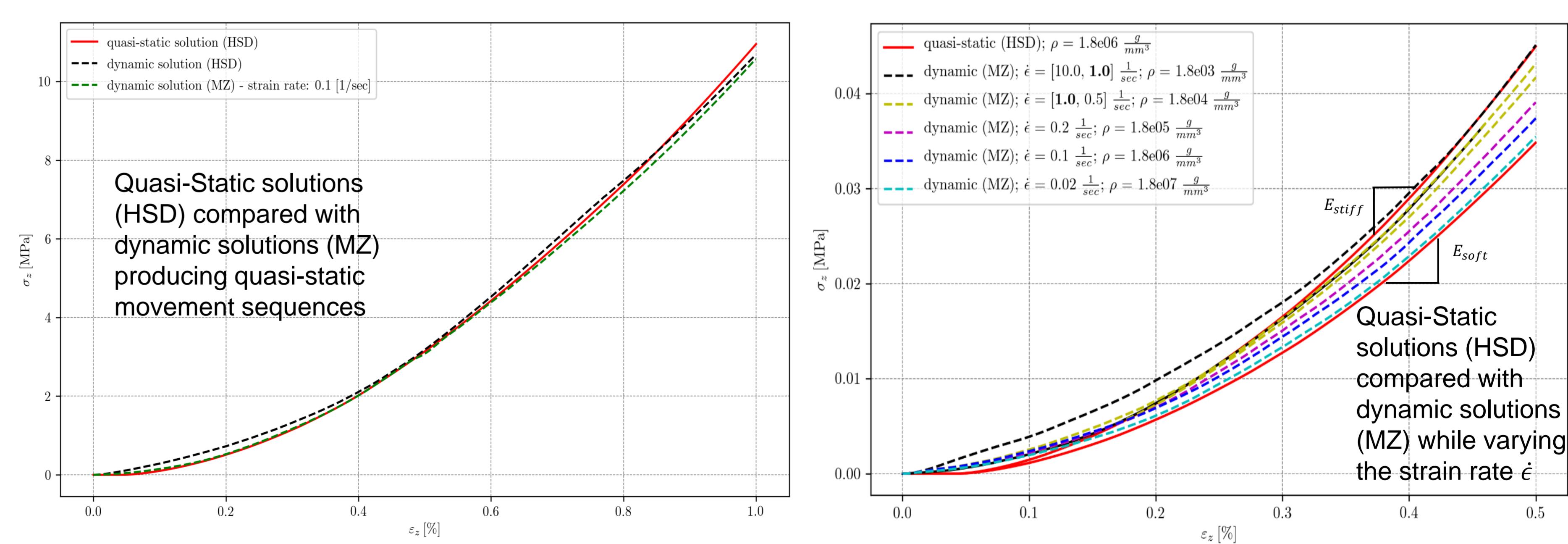
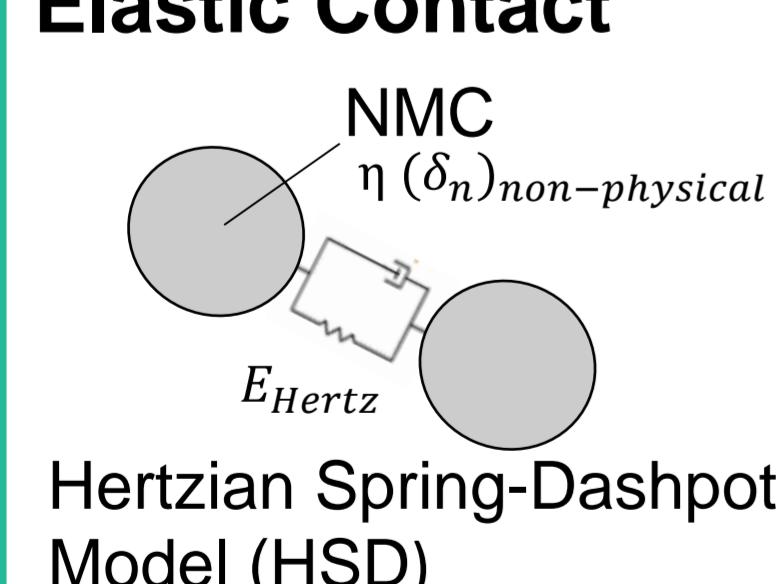
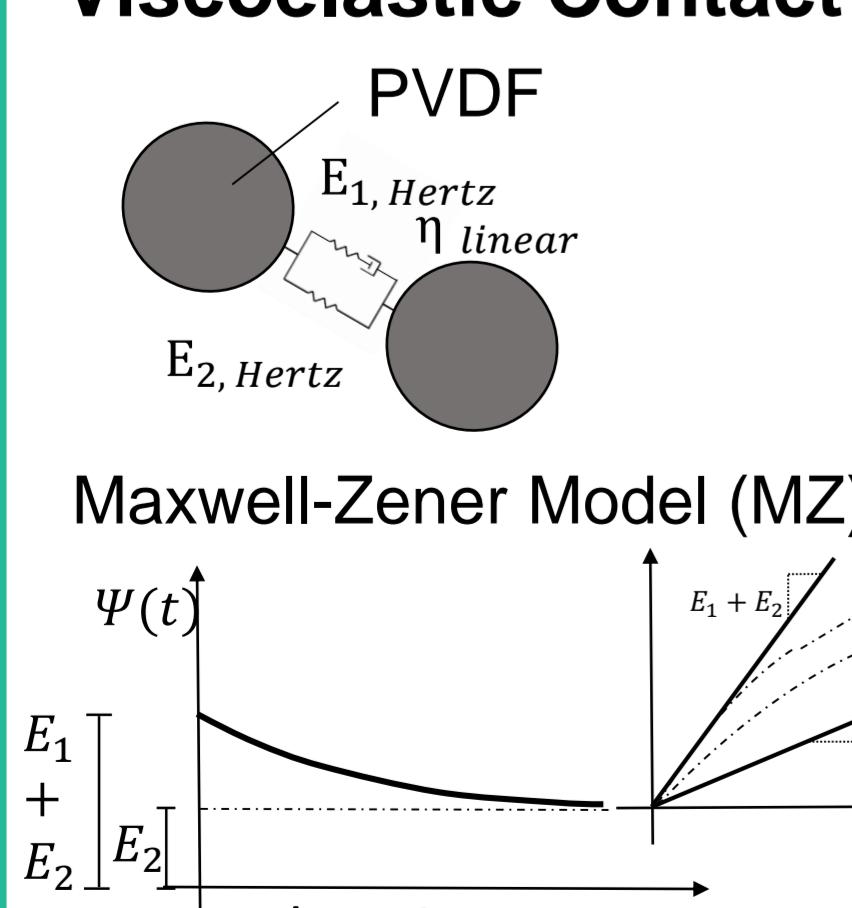
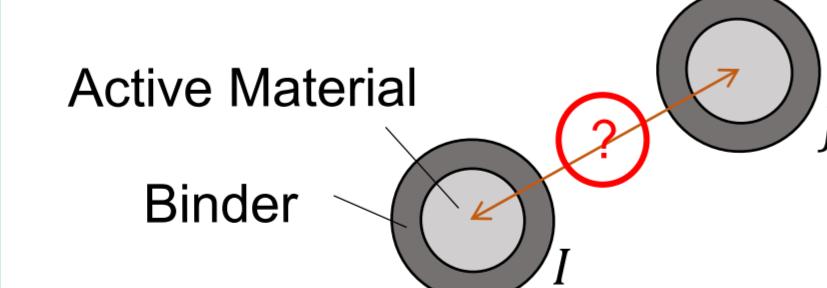
A. Wahn, M. Kamlah


Real Cathode [1]

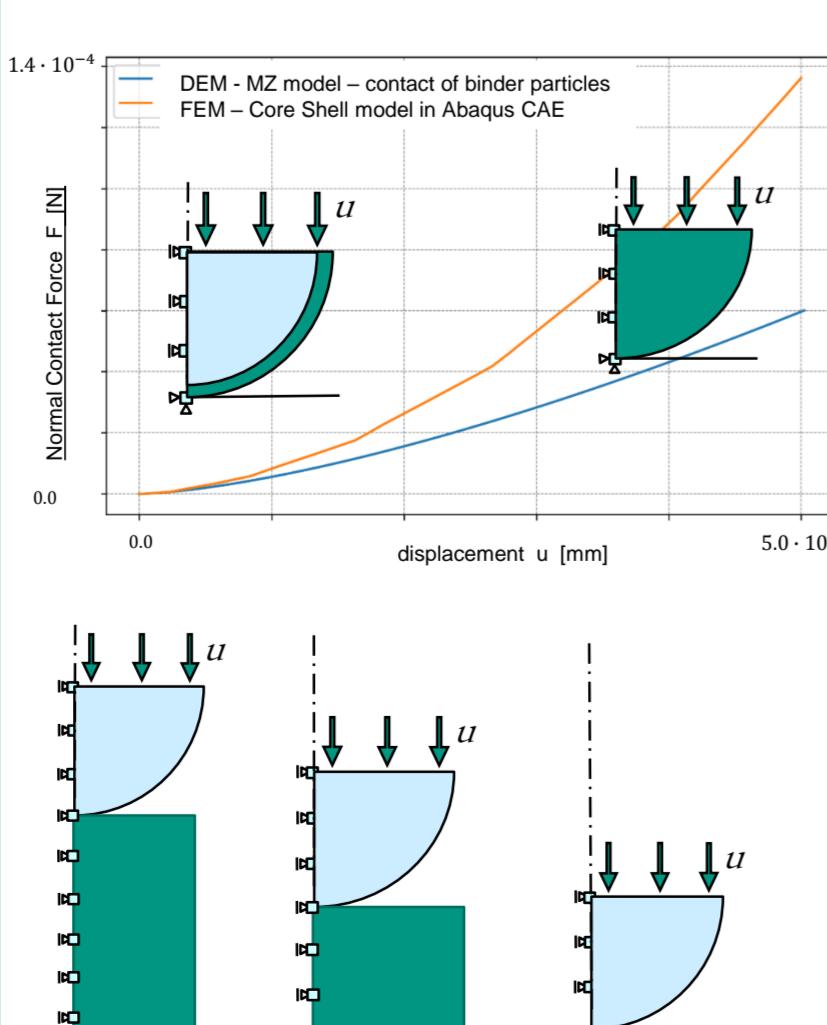
- Active Material (Nickel-Manganese-Cobalt Oxide, NMC)
- Binder (Polyvinylidene Fluoride, PVDF)
- Conductive Additives (Carbon Black)



- experimental mechanical compression of the granular cathode
- hysteresis results from particle rearrangement and material behavior of viscoelastic PVDF.


Initial Structure
Random Close Packing Algorithm [2,3,4]

Drop and Roll Algoithm [5]

Mechanical Compression with Discrete Element Method (DEM) [4,6]
Procedure

2 spherical Particles

250 spherical Particles

Contact behavior using Rheological Models [7,8]
Elastic Contact

Viscoelastic Contact

Outlook


Combination of NMC and PVDF in case of contact only for mechanical investigations of the cathode structure


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