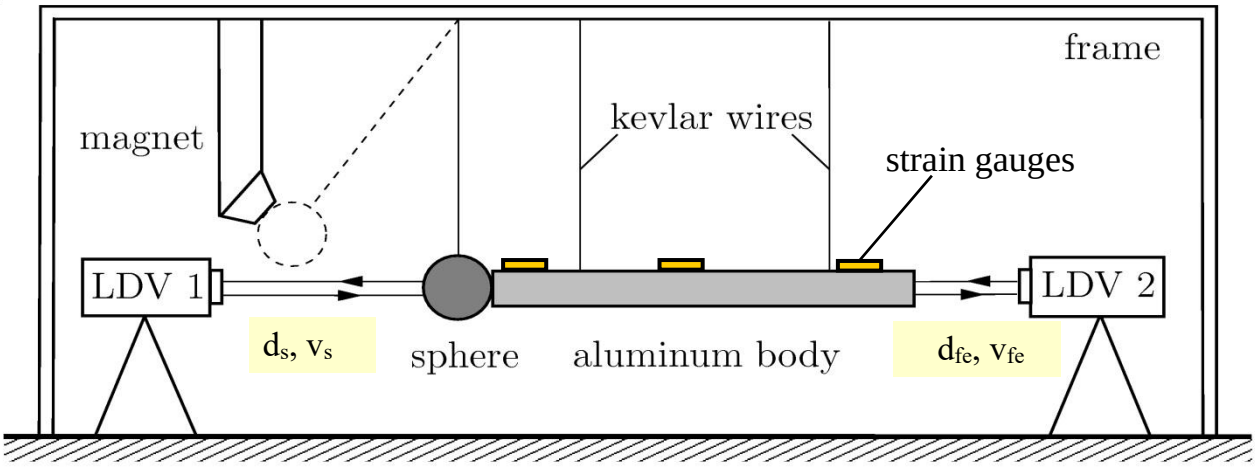
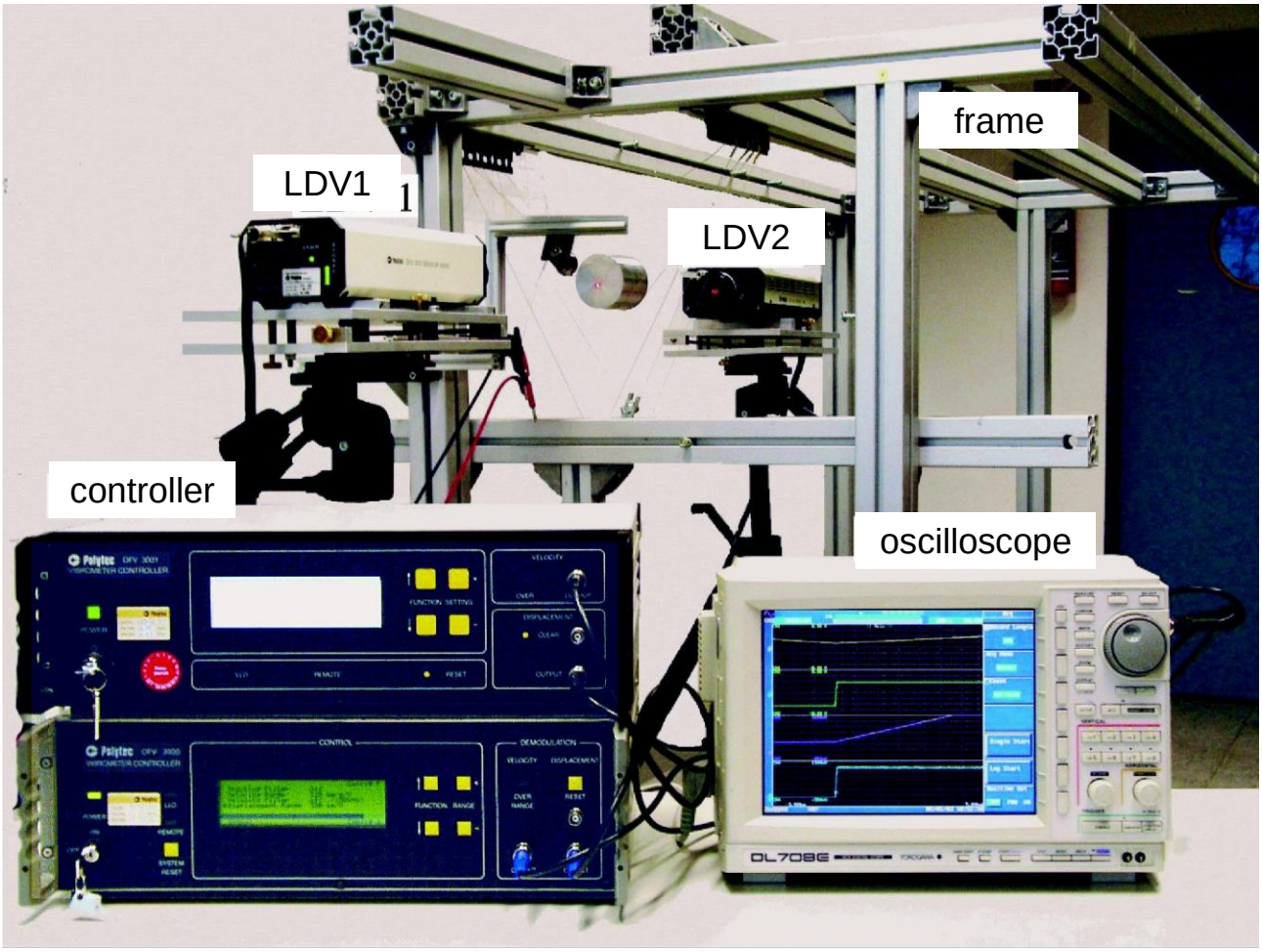
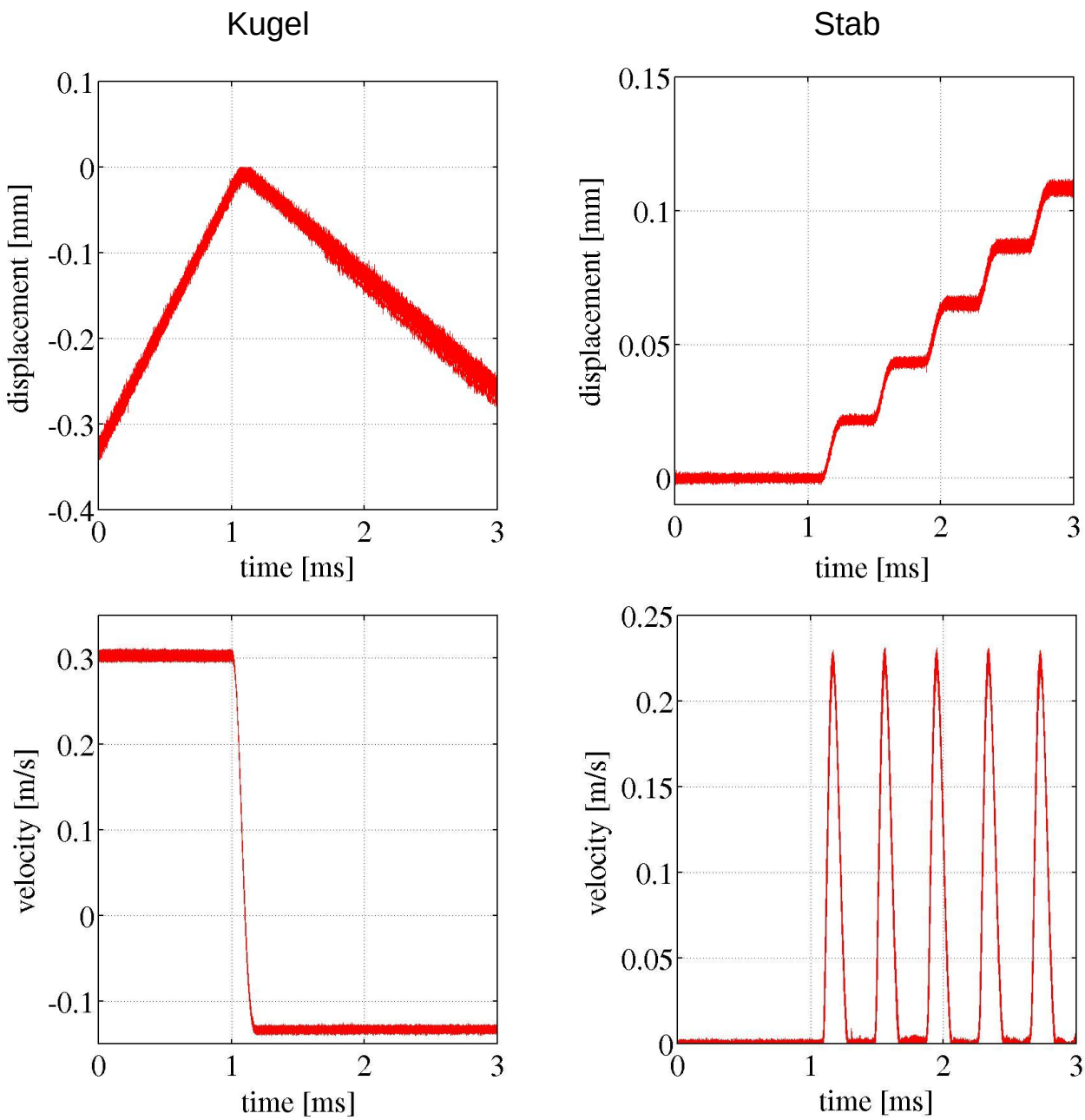
Versuchsaufbau für Stoßanalyse



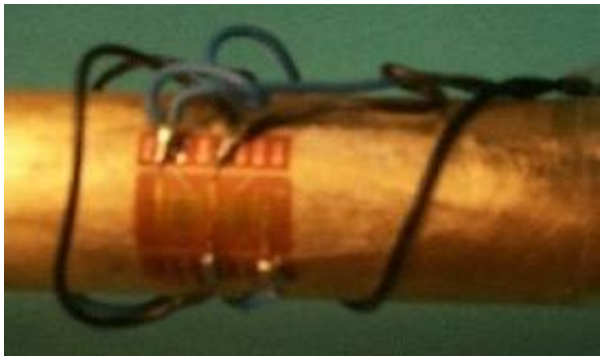


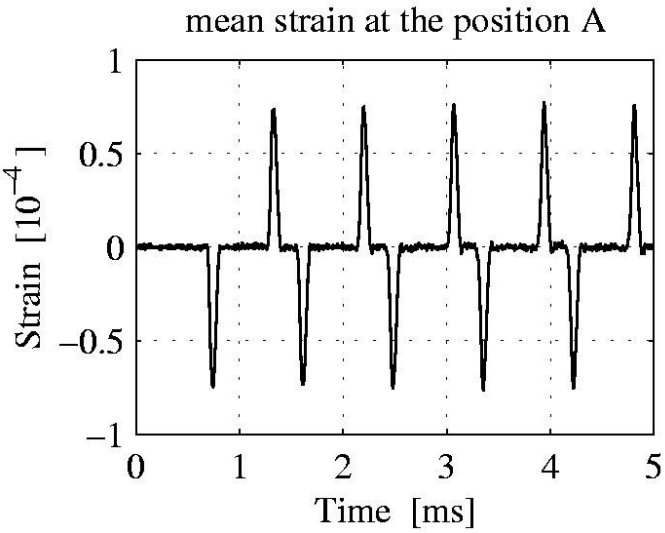
Stoß Stahlkugel-Aluminiumstab: 20 Messung mit LDV

(Kugel: r=15mm, Stab: r=10mm, l=1000mm)



Messung der Dehnungen am Stab mit DMS





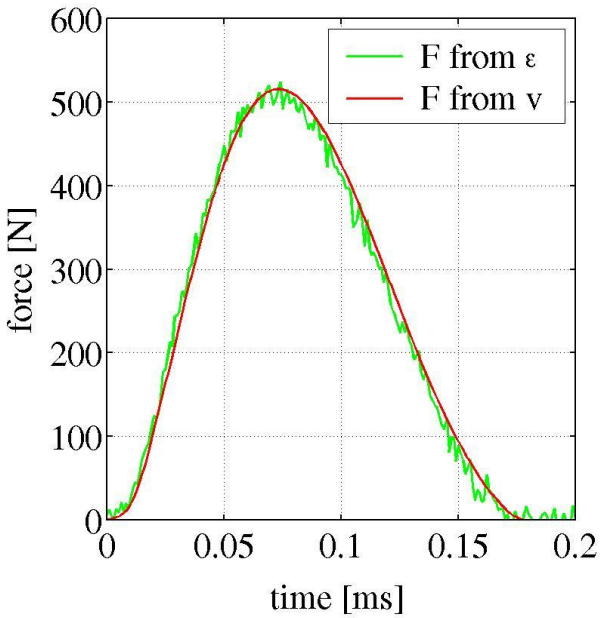
Bestimmung der Stoßkräfte am Stab

aus DMS Messung ε: $F = A\,E\,\varepsilon$

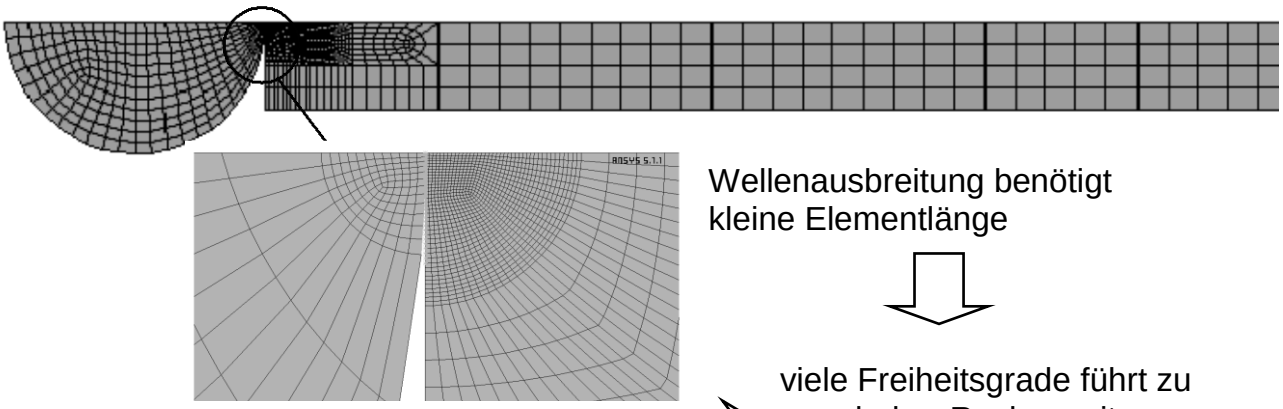
aus LDV Messung v_{fe}: $F = \dfrac{A\,E\,v_{fe}}{2c}$ mit $c = \sqrt{\dfrac{E}{\rho}}$

A: Querschnittsfläche,
E: E-modul
ρ: Dichte

[Wave Motion in Elastic Solids, Graff, 1975]



Modellierung von Stoßproblemen mit nichtlinearer FEM



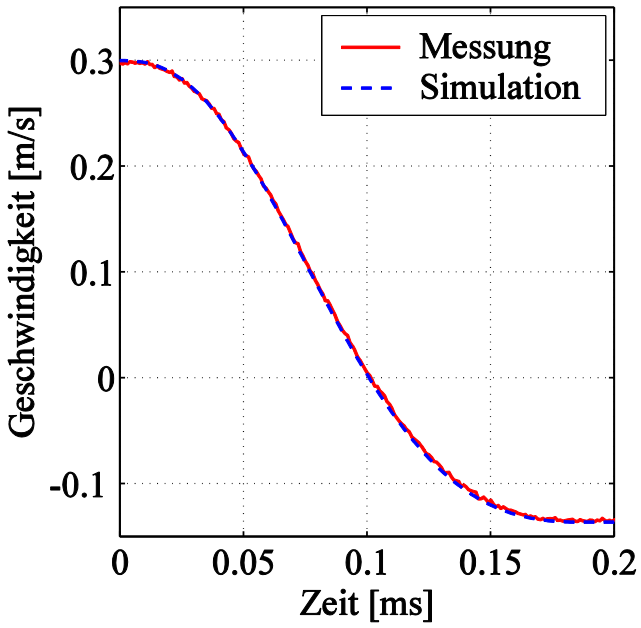
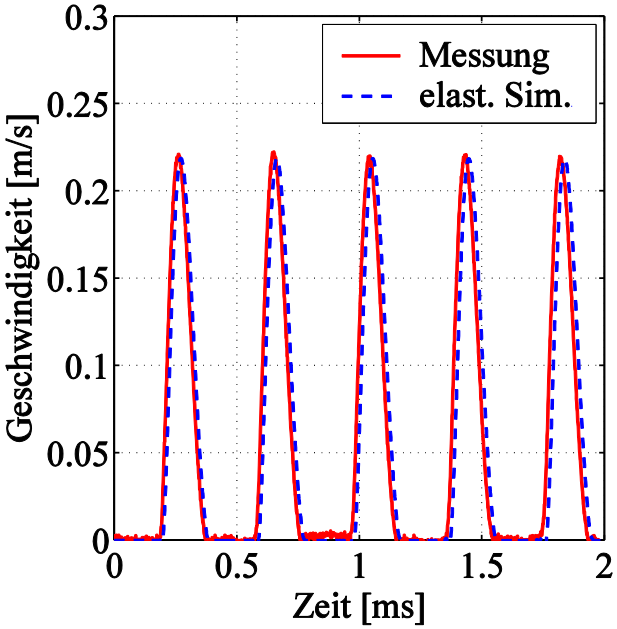
Wellenausbreitung benötigt kleine Elementlänge

viele Freiheitsgrade führt zu hoher Rechenzeit

Netzverfeinerung in der Kontaktzone

Vergleich von Messung und Simulation

Kugel



Stab