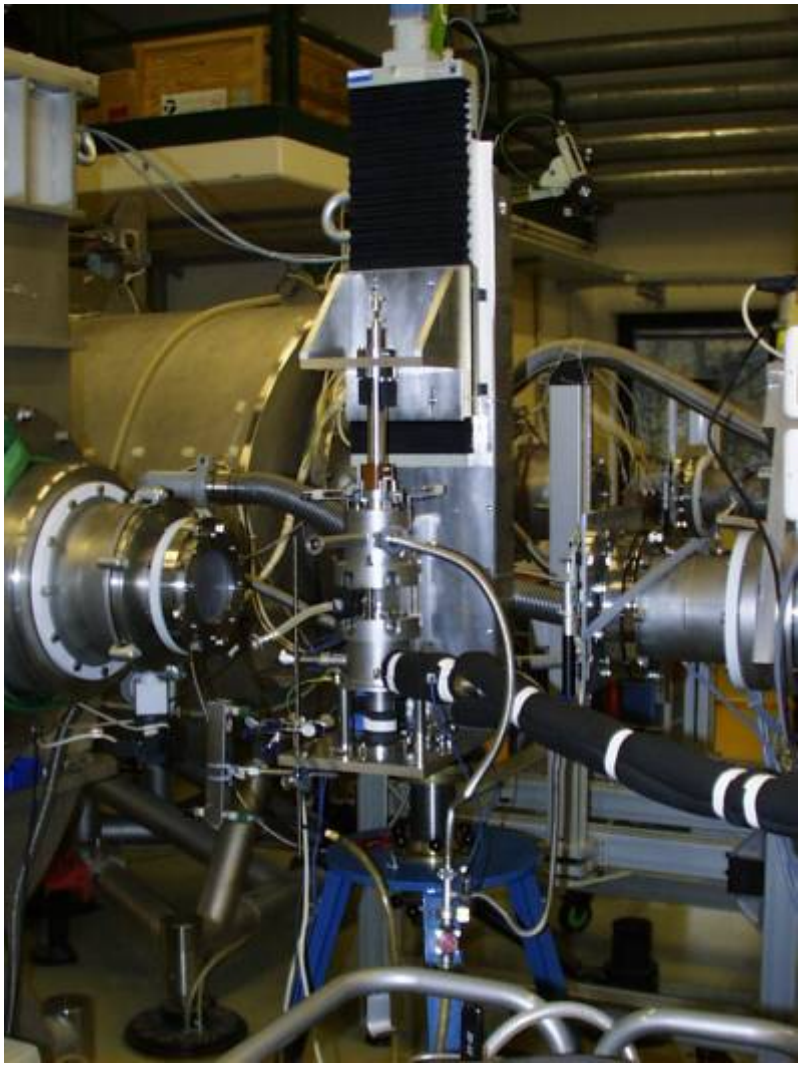

Nonlinear relaxation phenomena in linear and branched polymer melts

Branched polymers behave rheologically very different from linear chains. Here, time-dependent phenomena can be de-coupled by freezing-in of states. For large strains, both type of chains are not fully studied to date and still basic processes like retraction, tube dilution and constraint release effects are to be investigated in detail. Quenched strained melts can be studied now by insitu SANS and extensional rheology to locally investigate the structural relaxations on different hierarchical levels. Long chain branching relieves intrinsic difficulties with processing of linear chains as is well known.
The gap between the rheological description and molecular details was bridged recently in collaboration with the Leeds group (UK) and Halle (D).
Also the retraction process, presumed to occur immediately after a fast non-linearly stretching has been studied and detected for the first time. The elongational rheometer operates between -100 and +200°C and stretching rates are variable. The load cell allows the full dynamic modulus to be measured as a function of time in the same temperature range.

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