Glasses are very old materials used for centuries but still the subject of actual research. In this talk first the material "glass" will be introduced to a broader audience by showing some typical examples and properties. Then we focus on the rather new subclass of metallic glasses and show some recent results on the dynamic mechanical properties of so called "fragile" and "strong" glass forming liquids. These are the typical representatives of more then 30 metallic glass systems which are known today and used in a variety of applications. A microscopic model for the macroscopic properties of these materials is developed recently in collaboration with the group of W.L. Johnson at Caltech. The alpha- and beta relaxation of the systems can be explained within the Potential Energy Landscape picture. Here we combine these ideas with computer simulations by S.G. Mayr et al. which give an inside into the origin of the typical glassy behavior which is so different compared to crystalline materials. Using these results we can predict the rheology of metallic liquids including the strain rate dependence and compare the model with most recent ultrasound measurements of the shear modulus which is the most important materials parameter.

Universitätsgebäude, Hörsaal 3,
Donnerstag, den 5. Juni 2008 um 17 Uhr c.t.

gez. Prof. Dr. Thomas Koop, Prof. Dr. Uwe Manthe, Prof. Dr. Jochen Mattay