

**Plenarvortrag** PV VI Do 11:00 30.95: 001  
**Quantum Field Theory on curved backgrounds and its impact on cosmology** — ●KLAUS FREDENHAGEN — II. Institut für Theoretische Physik, Hamburg

The general structure of quantum field theory on curved backgrounds is nowadays well understood on the basis of the principle of local covariance and the microlocal spectrum condition. It requires, however, to give up the traditional interpretation of quantum field theory in terms of particle scattering. If applied to cosmology, the interpretation

of observations in terms of classical matter turns out to be insufficient and has to be replaced by an interpretation in terms of locally covariant quantum fields whose definition involve a few free parameters which are independent of the spacetime structure and the quantum state.  
These concepts were applied to the semiclassical Einstein equation for a free quantum field. An evaluation of this equation in a suitable state provides a time evolution of the scale parameter of the Friedmann universe which is in perfect agreement with recent cosmological data and provides a natural explanation of dark energy and dark matter.