

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Gravity and Fundamental Physics (1)Author: Prof. Claus Lämmerzahl
ZARM Fab GmbH, GermanyA COVARIANT FORMULATION DESCRIBING VIOLATIONS OF THE EQUIVALENCE PRINCIPLE
AND ITS CONSEQUENCES FOR EXPERIMENTS**Abstract**

Usually a violation of the Equivalence Principle is described within a Newtonian framework by introducing inertial and gravitational masses. Within General Relativity it is not obvious how to couple different particles differently to the same space-time geometry. Here we propose a unifying scheme where in a given geometrical background a violation of the universality of free fall combined with a violation of the universality of frame dragging. Within this fully covariant formalism there are more than one parameter related to a violation of the Equivalence Principle. While the Newtonian framework is related to weak gravity only, this covariant formalism is valid in strong gravitational field, too. This new parametrization will be discussed for the free fall of point masses for a MICROSCOPE-like mission and for a radial free fall towards the Earth. In addition, examples for testing the universality of frame dragging are presented.