Division of Mathematics
Department of Integrated Human Sciences

Outline

Mathematics is an essential tool for understanding the natural sciences. Our division provides lectures in mathematics, statistics, and introductory physics. Current research interests are alternative gravity theories; in particular, the gravity theory described by the Cotton tensor.

Faculty members

Associate professor: Junpei Harada, Ph.D.

Main research in progress

1) Alternative gravity theory (Cotton gravity)
2) General Relativity

Current publications

Emergence of the Cotton tensor for describing gravity, J. Harada, Phys.Rev.D **103** (2021) 12, L121502.

Connection independent formulation of general relativity, J. Harada, Phys.Rev.D **101** (2020) 2, 024053.

Extension of Malcev Algebra and Applications to Gravity, J. Harada, Fortsch.Phys. **67** (2019) 7, 1900027.

Gauge coupling unification with extra Higgs doublets, J. Harada, Fortsch.Phys. **64** (2016) 6-7, 510-515.

Non-maximal θ_{23}, large θ_{13} and tri-bimaximal θ_{12} via quark-lepton complementarity at next-to-leading order, J. Harada, EPL **103** (2013) 2, 21001.

Spontaneous symmetry breaking in superfluid helium-4, J. Harada, Phys.Lett.A **367** (2007) 6, 489-492.

Neutrino mixing and CP violation from Dirac-Majorana bimaximal mixture and quark-lepton unification, J. Harada, EPL **75** (2006) 248-253.

Hypercharge and baryon minus lepton number in E_6, J. Harada, JHEP **04** (2003) 011.