

# Gravitational anomaly and fundamental forces

J.J. van der Bij

(Submitted on 19 Jan 2010)

I present an argument, based on the topology of the universe, why there are three generations of fermions. The argument implies a preferred gauge group of  $SU(5)$ , but with  $SO(10)$  representations of the fermions. The breaking pattern  $SU(5)$  to  $SU(3)\times SU(2)\times U(1)$  is preferred over the pattern  $SU(5)$  to  $SU(4)\times U(1)$ . On the basis of the argument one expects an asymmetry the early universe microwave data, which might have been detected already.

Comments: Contribution to the 2nd School and Workshop on Quantum Gravity and Quantum Geometry. Corfu, september 13-20 2009. 10 pages

Subjects: **High Energy Physics - Phenomenology (hep-ph)**; General Relativity and Quantum Cosmology (gr-qc)

Report number: Freiburg-PHENO-2010-005

Cite as: [arXiv:1001.3236v1](https://arxiv.org/abs/1001.3236v1) [hep-ph]

## Submission history

From: Jochum van der Bij [[view email](#)]

[v1] Tue, 19 Jan 2010 09:38:57 GMT (11kb)

*[Which authors of this paper are endorsers?](#)*