

# Dirac quasinormal modes of $D$ -dimensional de Sitter spacetime

A. López-Ortega

Received: 7 January 2007 / Accepted: 11 April 2007 / Published online: 16 May 2007  
© Springer Science+Business Media, LLC 2007

**Abstract** We find exact solutions to the Dirac equation in  $D$ -dimensional de Sitter spacetime. Using these solutions we analytically calculate the de Sitter quasinormal (QN) frequencies of the Dirac field. For the massive Dirac field this computation is similar to that previously published for massive fields of half-integer spin moving in four dimensions. However to calculate the QN frequencies of the massless Dirac field we must use distinct methods in odd and even dimensions, therefore the computation is different from that already known for other massless fields of integer spin.

**Keywords** Quasinormal modes · de Sitter · Dirac field

## 1 Introduction

The recent studies on the propagation of classical fields in  $D$ -dimensional ( $D \geq 4$ ) spacetimes are mainly motivated by the Brane World scenario in String Theory and the scrutiny of the higher dimensional features of General Relativity. Also, the dS-CFT and AdS-CFT correspondences have motivated the study of classical fields moving in spacetimes with dimension different from four, generally in asymptotically de Sitter or anti-de Sitter backgrounds (see [1] for a review and for some references on this topic see [2–35]).

---

A. López-Ortega  
Facultad de Ciencias, Universidad de Colima, Bernal Diaz del Castillo 340,  
Colima, Colima, México

A. López-Ortega (✉)  
Departamento de Física, CINVESTAV-IPN, Apartado Postal 14-740,  
07000 México Distrito Federal, México  
e-mail: alfredo@fis.cinvestav.mx