

Accepted Manuscript

Inflation and quantum gravity in a Born–Oppenheimer context

Alexander Y. Kamenshchik, Alessandro Tronconi, Giovanni Venturi

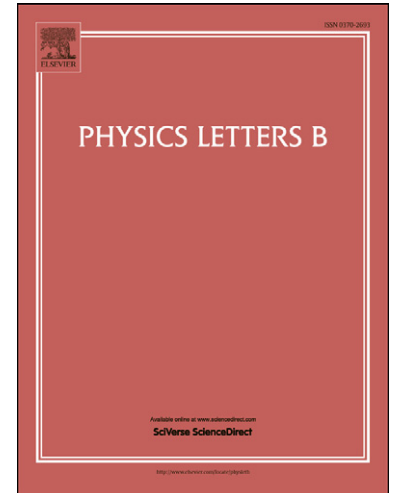
PII: S0370-2693(13)00706-5
DOI: [10.1016/j.physletb.2013.08.067](http://dx.doi.org/10.1016/j.physletb.2013.08.067)
Reference: PLB 29643

To appear in: *Physics Letters B*

Received date: 27 May 2013
Revised date: 29 July 2013
Accepted date: 26 August 2013

Please cite this article in press as: A.Y. Kamenshchik et al., Inflation and quantum gravity in a Born–Oppenheimer context, *Physics Letters B* (2013), <http://dx.doi.org/10.1016/j.physletb.2013.08.067>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Inflation and Quantum Gravity in a Born-Oppenheimer Context

Alexander Y. Kamenshchik

*Dipartimento di Fisica e Astronomia and INFN, Via Irnerio 46,40126 Bologna, Italy
L.D. Landau Institute for Theoretical Physics of the Russian Academy of Sciences, Kosygin
str. 2, 119334 Moscow, Russia*

Alessandro Tronconi

Dipartimento di Fisica e Astronomia and INFN, Via Irnerio 46,40126 Bologna, Italy

Giovanni Venturi

Dipartimento di Fisica e Astronomia and INFN, Via Irnerio 46,40126 Bologna, Italy

Abstract

A general equation, describing the lowest order corrections coming from quantum gravitational effects to the spectrum of cosmological scalar fluctuations is obtained. These corrections are explicitly estimated for the case of a de Sitter evolution.

Keywords: quantum cosmology, inflation, cosmological perturbations
PACS: 98.70.Vc, 04.60.Bc, 04.60.Ds, 98.80.Qc

1. Introduction

The effects of quantum gravity are supposed to be very small since they are suppressed by the huge value of the Planck mass. They can become essential in the presence of a strong gravitational field or in the very early universe undergoing an inflationary expansion (see e.g. [1]). In this letter we would like to study the possible influence of quantum gravitational effects on the spectrum of cosmological fluctuations produced during inflation. Such fluctuations are imprinted in the cosmic microwave background radiation which is one of the main sources of information on the very early universe (see e.g. [2]).

The Born-Oppenheimer (BO) approach [3] has been extensively applied to composite systems such as molecules, which involve two mass, or time, scales.

Email addresses: Alexander.Kamenshchik@bo.infn.it (Alexander Y. Kamenshchik),
Alessandro.Tronconi@bo.infn.it (Alessandro Tronconi), Giovanni.Venturi@bo.infn.it
(Giovanni Venturi)

Download English Version:

<https://daneshyari.com/en/article/8188534>

Download Persian Version:

<https://daneshyari.com/article/8188534>

[Daneshyari.com](https://daneshyari.com)