Cosmology and Modified Gravity:
Selected contributions by Prof. S. Nojiri

S.D. Odintsov (ICREA and ICE-CSIC, Barcelona)

Early Works

From 1990’s To Early 2000’s

Our First Paper

E. Elizalde, S. D. Odintsov, S. Nojiri, M. Kawamura and A. Sugamoto, “Quantum effects of stringy and membranic nature for the swimming of microorganisms in a fluid,” *Int. J. Mod. Phys. A 11 (1996) 5569*

Quantum effects of stringy and membranic nature for the swimming of micro-organisms in a fluid

E. Elizalde[◇1], M. Kawamura[♡2], S. Nojiri[♠3], S.D. Odintsov[♣4] and A. Sugamoto[♡5]

◇ Dipartimento di Fisica, Università degli Studi di Trento, Italia
and Center for Advanced Studies CEAB, CSIC, Camí de Santa Bàrbara, 17300 Blanes, Spain

♡ Department of Physics, Ochanomizu University
1-1, Otsuka 2, Bunkyo-ku, Tokyo, 112, Japan

♠ Department of Mathematics and Physics, National Defence Academy
Yokosuka, 239, Japan

♣ Tomsk Pedagogical Institute, 634041 Tomsk, Russia,
and Department ECM, Faculty of Physics, University of Barcelona,
Diagonal 647, 08028 Barcelona, Spain

Early Works

D-brane in EM field

- On the instability of effective potential for nonAbelian toroidal D-brane, *Phys. Lett. B 419 (1998) 107*

Trace anomaly for dilaton-coupled scalars

- Trace anomaly and nonlocal effective action for 2-D conformally invariant scalar interacting with dilaton, *Mod. Phys. Lett. A 12 (1997) 2083*
- Trace anomaly induced effective action for 2-D and 4-D dilaton coupled scalars, *Phys. Rev. D 57 (1998) 2363*
- Quantum cosmology in the models of 2-D and 4-D dilatonic supergravity with WZ matter, *Phys. Rev. D 58 (1998) 084026*, with S. J. Gates, Jr., T. Kadoyoshi

Early Works

Anti-evaporation of BHs

- Effective action for conformal scalars and anti-evaporation of black holes, *Int. J. Mod. Phys. A 14 (1999) 1293*
- Quantum evolution of Schwarzschild-de Sitter (Nariai) black holes, *Phys. Rev. D 59 (1999) 044026*

AdS/CFT aspects

- Conformal anomaly for dilaton coupled theories from AdS/CFT correspondence, *Phys. Lett. B 444 (1998) 92*
- Two boundaries AdS / CFT correspondence in dilatonic gravity, *Phys. Lett. B 449 (1999) 39*
- On the conformal anomaly from higher derivative gravity in AdS/CFT correspondence, *Int. J. Mod. Phys. A 15 (2000) 413*
- AdS/CFT correspondence, conformal anomaly and quantum corrected entropy bounds, *Int. J. Mod. Phys. A 16 (2001) 3273*

Early Works

Quantum brane-world inflation

- Quantum (in)stability of dilatonic AdS backgrounds and holographic renormalization group with gravity, *Phys. Rev. D 62 (2000) 064006*, with S. Zerbini
- Brane world inflation induced by quantum effects, *Phys. Lett. B 484 (2000) 119*
- Brane world cosmology in higher derivative gravity or warped compactification in the next-to-leading order of AdS / CFT correspondence, *JHEP 0007 (2000) 049*

Dilatonic gravity

- Quantum dilatonic gravity in (D = 2)-dimensions, (D = 4)-dimensions and (D = 5)-dimensions, *Int. J. Mod. Phys. A 16 (2001) 1015*

Early Works

dS/CFT

- Conformal anomaly from dS/CFT correspondence, *Phys. Lett. B 519 (2001) 145*
- Quantum cosmology, inflationary brane world creation and dS/CFT correspondence, *JHEP 0112 (2001) 033*

Brane-world HD gravity

- Cosmological and black hole brane world universes in higher derivative gravity, *Phys. Rev. D 65 (2002) 023521*, with S. Ogushi
- Anti-de Sitter black hole thermodynamics in higher derivative gravity and new confining deconfining phases in dual CFT, *Phys. Lett. B 521 (2001) 87*

Negative entropy in HD gravity

- Black hole thermodynamics and negative entropy in de Sitter and anti-de Sitter Einstein-Gauss-Bonnet gravity, *Nucl. Phys. B 628 (2002) 295*, with M. Cvetic

Cosmology

Cosmology

Phantoms

- Quantum de Sitter cosmology and phantom matter, *Phys. Lett. B 562 (2003) 147*
- DeSitter brane universe induced by phantom and quantum effects,
  Phys. Lett. B 565 (2003) 1

F(R) gravity from strings

- Where new gravitational physics comes from: M Theory?,
  Phys. Lett. B 576 (2003) 5

First consistent model of F(R) gravity unifying inflation with DE **~1350 citations!**

- Modified gravity with negative and positive powers of the curvature:
  Unification of the inflation and of the cosmic acceleration,
  Phys. Rev. D 68 (2003) 123512

Cosmology

Proposal of non-minimal gravity:matter couples with F(R)

- Gravity assisted dark energy dominance and cosmic acceleration, *Phys. Lett. B 599 (2004) 137*

Proposal of generalized quintom theory

- Late-time cosmology in (phantom) scalar-tensor theory: Dark energy and the cosmic speed-up, *Phys. Rev. D 70 (2004) 043539*, with E. Elizalde

Sudden future singularity

- Quantum escape of sudden future singularity, *Phys. Lett. B 595 (2004) 1*

Thermodynamics of phantom universe

- The Final state and thermodynamics of dark energy universe, *Phys. Rev. D 70 (2004) 103522*

Cosmology

Classification of future singularities

- Properties of singularities in (phantom) dark energy universe, *Phys. Rev. D 71 (2005) 063004*, with S. Tsujikawa

One-loop corrections in F(R) gravity

- One-loop f(R) gravity in de Sitter universe, *JCAP 0502 (2005) 010*, with G. Cognola, E. Elizalde, and S. Zerbini

Proposal of GB DE

- Gauss-Bonnet dark energy, *Phys. Rev. D 71 (2005) 123509*, with M. Sasaki,

Inhomogeneous EoS and future universe

- Inhomogeneous equation of state of the universe: Phantom era, future singularity and crossing the phantom barrier, *Phys. Rev. D 72 (2005) 023003*

Cosmology

Generalized Holographic DE

- Unifying phantom inflation with late-time acceleration: Scalar phantom-non -phantom transition model and generalized holographic dark energy,
  Gen. Rel. Grav. 38 (2006) 1285

Modified GB DE

- Modified Gauss-Bonnet theory as gravitational alternative for dark energy,
  Phys. Lett. B 631 (2005) 1
- Dark energy in modified Gauss-Bonnet gravity: Late-time acceleration and the hierarchy problem, *Phys. Rev. D 73 (2006) 084007*,
  with G. Cognola, E. Elizalde and S. Zerbini

Review on modified gravity

~1850 citations!

- Introduction to modified gravity and gravitational alternative for dark energy,
  eConf C 0602061 (2006) 06 [Int. J. Geom. Meth. Mod. Phys. 4 (2007) 115]

Cosmology

Physical non-equivalence on Einstein and F(R) Jordan

- Cosmological viability of f(R)-gravity as an ideal fluid and its compatibility with a matter dominated phase, *Phys. Lett. B 639 (2006) 135*,
  with S. Capozziello and A. Troisi

Realistic F(R) models

- Modified f(R) gravity consistent with realistic cosmology: From matter dominated epoch to dark energy universe, *Phys. Rev. D 74 (2006) 086005*
- Modified f(R) gravity unifying R^m inflation with Lambda CDM epoch,
  Phys. Rev. D 77 (2008) 026007
- A Class of viable modified f(R) gravities describing inflation and the onset of accelerated expansion, *Phys. Rev. D 77 (2008) 046009*,
  with G. Cognola, E. Elizalde, L. Sebastiani and S. Zerbini

Cosmology

Non-local F(R) gravity

- Modified non-local-F(R) gravity as the key for the inflation and dark energy, *Phys. Lett. B 659 (2008) 821*

Future singularities in F(R)

- The Future evolution and finite-time singularities in F(R)-gravity unifying the inflation and cosmic acceleration, *Phys. Rev. D 78 (2008) 046006*
- The Universe future in modified gravity theories: Approaching the finite-time future singularity, *JCAP 0810 (2008) 045*, with K. Bamba
- Classifying and avoiding singularities in the alternative gravity dark energy models, *Phys. Rev. D 79 (2009) 124007*, with S. Capozziello and M. De Laurentis

Cosmology

Reconstruction of F(R) cosmology

- Cosmological reconstruction of realistic modified F(R) gravities, *Phys. Lett. B 681 (2009) 74*, with D. Saez-Gomez

Review

~1740 citations!

- Unified cosmic history in modified gravity: from F(R) theory to Lorentz non-invariant models, *Phys. Rept. 505 (2011) 59*

F(R,T)

- f(R,T) gravity, *Phys. Rev. D 84 (2011) 024020*, with T. Harko, F. S. N. Lobo

Little Rip

- Viscous Little Rip Cosmology, *Phys. Rev. D 84 (2011) 103508*, with I. Brevik, E. Elizalde

Cosmology

Cosmology-review on DE

- Dark energy cosmology: the equivalent description via different theoretical models and cosmography tests, *Astrophys. Space Sci. 342 (2012) 155*,
  with K. Bamba and S. Capozziello

Bounces in F(R)

- Bounce cosmology from F(R) gravity and F(R) bigravity, *JCAP 1401 (2014) 008*,
  with K. Bamba, A. N. Makarenko and A. N. Myagky

Generalizations

- Mimetic F(R) gravity: inflation, dark energy and bounce,
  Mod. Phys. Lett. A 29 (2014) no.40, 1450211
- Unimodular F(R) Gravity, *JCAP 1605 (2016) no.05, 046*, with V. K. Oikonomou

Cosmology

GWs

Cosmological Bound from the Neutron Star Merger GW170817 in scalar-tensor and F(R) gravity theories, *Phys. Lett. B 779 (2018) 425*

Fresh review

Modified Gravity Theories on a Nutshell: Inflation, Bounce and Late-time Evolution, *Phys. Rept. 692 (2017) 1*, with V. K. Oikonomou