

# Modified Gravity and Cosmology: *Sergei Dmitrievich Odintsov turns 60*

Emilio Elizalde

*ICE, Bellaterra, May 2019*









## Sergei arrives at Barcelona ... [cf. "Yuri arriving at Varykino" - Maurice Jarre]

- Graduated from Tomsk State Univ (1981), PHD degree (1985), Doctor of Science degree (1991) BITP, Kiev. Full prof. of TSPU, since 1991.
- 1991: Post-Doc with E. Alvarez in Madrid UAM. 1992: 1<sup>st</sup> Visiting Professor at UB Barcelona 1992-95 and 1998-99.
- TV3, Fax at full speed, preprints --a total revolution in our quiet habits.
- 1992: Trento collaboration started (H. Accademia). Lasted 25+ Years.
- Visiting U's in Japan, Colombia, Brazil, Mexico, Norway, ...
- Back to Barcelona in 2002. ICREA Professor in 2003 (among 1<sup>st</sup>).

# Key words

dark energy; inflation; modified gravity;  
string theory and quantum gravity;  
cosmology; quantum fields;  
astrophysics and black holes;  
Casimir effect



# Main Results

- ❑ Developed a theory which describes our Universe history.
- ❑ Formulate a consistent alternative to Einstein's gravity to resolve the Universe acceleration puzzle.
- ❑ Proposed the first modified gravity which may describe the unification of early-time inflation (including the singular one) and late-time acceleration.
- ❑ Proposed a bouncing universe in modified gravity as an alternative to inflation.
- ❑ Study of the Universe future: if it will expand eternally or its evolution will be finished in a future singularity (actually much before, via disintegration of bound objects).

- *Unified cosmic history in modified gravity: from  $F(R)$  theory to Lorentz non-invariant models*  
S Nojiri, SD Odintsov, Phys. Rep. 505, 59-144 [cit2132](#) 2011
- *Introduction to modified gravity and gravitational alternative for dark energy*  
SI Nojiri, SD Odintsov, Int. J. Geom. Meth. Mod. Phys. 4, 115-145 [cit2066](#) 2007
- *Modified gravity with negative and positive powers of the curvature: Unification of the inflation and of the cosmic acceleration*, S Nojiri, SD Odintsov, Phys. Rev. D 68, 123512 [cit1661](#) 2003
- *Effective action in quantum gravity*, IL Buchbinder, SD Odintsov, IL Shapiro, CRC P [cit1229](#) 1992
- *Dark energy cosmology: the equivalent description via different theoretical models and cosmography tests*, K Bamba, S Capozziello, S Nojiri, SD Odintsov  
Astr. Space Sci. 342, 155-228 [cit1068](#) 2012
- *Properties of singularities in the (phantom) dark energy universe*  
S Nojiri, SD Odintsov, S Tsujikawa, Phys. Rev. D71, 063004 [cit1056](#) 2005
- *Zeta Regularization Techniques with Applications*  
E Elizalde, SD Odintsov, A Romeo, AA Bytsenko, S Zerbini, 319 [cit947](#) 1994
- *Late-time cosmology in a (phantom) scalar-tensor theory: dark energy and the cosmic speed-up*  
E Elizalde, S Nojiri, SD Odintsov Physical Review D 70 (4), 043539 [cit895](#) 2004

# Main Achievements and Prizes

- ❑ About 600 journal articles, with about 40,000 citations.
- ❑ Three ms written while in ICREA and two books were cited more than 1000 times, 9 articles-more than 500 times
- ❑ Foreign Member of the Royal Norwegian Academy, member of the European Phys. Soc. And of the Italian Grav. Soc. .
- ❑ Amaldi Gold Medal: European Prize for Gravitational Physics 2014.
- ❑ Editorial Board Member of six journals and referee of about 20 journals (with excellence certificates from PLB, EPL, PRD, PRL and EPJC).
- ❑ Hirsch index  $h=95$  (Google Scholar),  $h=80$  (Web of Science) and  $h=89$  (inspire-hep).
- ❑ Top Cited Thomson-Reuters/Clarivate Researcher in 2014, 2015, 2016, 2017, 2018.
- ❑ Web.of Science 2017 Award.
- ❑ Silver Medal (2017) and Honorary Professorship (2019) of TSPU, Tomsk. ... ..



Sergei,

my very best desires for  
a wonderful life and an  
even better future