

Emma Lepri

Personal information

Email: **emma.lepri@uniroma1.it.**

Date of birth: **15 May 1995.**

Nationality: **Italian.**

Current position

November 2019-now **Ph.D. student in Mathematics**, *Università la Sapienza, Rome*, Tutor: Domenico Fiorenza, Advisor: Marco Manetti.

Education

September 2017 - July 2019 **Master Degree in Mathematics**, *Università la Sapienza, Rome*, 110/110 cum laude.

◦ **Thesis:** “*Model categories and deformations of diagrams of commutative algebras*”, under the supervision of Prof. Marco Manetti

September 2014 - July 2017 **Bachelor Degree in Mathematics**, *Università la Sapienza, Rome*, 110/110 cum laude.

◦ **Thesis:** “*Categorie modello e struttura modello di Quillen sulla categoria degli spazi topologici*”, (“*Model categories and Quillen model structure on the category of topological spaces*”), under the supervision of Prof. Marco Manetti

Papers and preprints

◦ E. Lepri, M. Manetti, “*On deformations of diagrams of commutative algebras*”, In: E. Colombo et al. (eds.), *Birational Geometry and Moduli Spaces*, Springer INdAM Series **39** (2020), 77-107. DOI: 10.1007/978-3-030-37114-2_6 arXiv:1902.10436.

Abstract: In this paper we study classical deformations of diagrams of commutative algebras over a field of characteristic 0. In particular we determine several homotopy classes of DG-Lie algebras, each one of them controlling this above deformation problem: the first homotopy type is described in terms of the projective model structure on the category of diagrams of differential graded algebras, the others in terms of the Reedy model structure on truncated Bousfield-Kan approximations. The first half of the paper contains an elementary introduction to the projective model structure on the category of commutative differential graded algebras, while the second half is devoted to the main results.

- E. Lepri, M. Manetti: “Connections and L_∞ liftings of semiregularity maps”, Journal of Geometry and Physics 168 (2021) 104303, DOI: 10.1016/j.geomphys.2021.104303, arXiv:2102.05016

Abstract: Let $\mathcal{E}^*$ be a finite complex of locally free sheaves on a complex manifold X . We prove that to every connection of type $(1, 0)$ on $\mathcal{E}^*$ it is canonically associated an L_∞ morphism

$$g: A_X^{0,*}(\mathcal{H}om_{\mathcal{O}_X}^*(\mathcal{E}^*, \mathcal{E}^*)) \rightsquigarrow \frac{A_X^{*,*}}{A_X^{\geq 2,*}}[2]$$

that lifts the 1-component of the Buchweitz-Flenner semiregularity map. An application to deformations of coherent sheaves on projective manifolds is given.

- E. Lepri, “Cyclic forms on DG-Lie algebroids and semiregularity”, preprint, arXiv:2104.12658

Abstract: Given a transitive DG-Lie algebroid $(\mathcal{A}, \rho)$ over a smooth separated scheme X of finite type over a field $\mathbb{K}$ of characteristic 0 we define a notion of connection $\nabla: \mathbf{R}\Gamma(X, \mathrm{Ker}\rho) \rightarrow \mathbf{R}\Gamma(X, \Omega_X^1[-1] \otimes \mathrm{Ker}\rho)$ and construct an L_∞ morphism between DG-Lie algebras $f: \mathbf{R}\Gamma(X, \mathrm{Ker}\rho) \rightsquigarrow \mathbf{R}\Gamma(X, \Omega_X^{\leq 1}[2])$ associated to a connection and to a cyclic form on the DG-Lie algebroid. In this way, we obtain a lifting of the first component of the modified Buchweitz-Flenner semiregularity map in the algebraic context, which has an application to the deformation theory of coherent sheaves on X admitting a finite locally free resolution. Another application is to the deformations of (Zariski) principal bundles on X .

Grants

- Winner of a grant “Progetti di Avvio alla Ricerca - tipo 1”, 2020, Università di Roma La Sapienza, for the project “Semiregularity map and L_∞ morphisms”

Languages

- **Italian:** native
- **English:** advanced
- **German:** basic