

*Supersymmetry Breaking
with
Fields, String and Branes*
(PRIN 2017CC72MK_003)

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Why This PRIN Project

This project is devoted to *supersymmetry breaking*, the key issue that lies behind the attempts to extend the Standard Model along directions leading to String Theory. Supersymmetry breaking can manifest itself, in String Theory, via deformed (Scherk-Schwarz) compactifications and also via suitable combinations of extended objects, branes. "Brane supersymmetry breaking", a mechanism identified long ago by the PI, is a natural entry point into this largely uncharted dynamics. In general, *supersymmetric breaking impinges on vacuum stability in profound ways, and the time is ripe to look more closely into all these related and highly intricate issues*. A combination of leading experts on string constructions, supergravity, flux compactifications, integrable systems, black holes and branes, and various aspects of Quantum Field Theory was thus devised, in order to grant the best chances to this effort. *The novel idea of the proposed project is an attempt to extend to non-supersymmetric cases, in both linear and non-linear regimes, at least part of the machinery that proved successful in the study of supersymmetric systems*. These types of phenomena can find indirect manifestations even in the CMB, and can potentially shed some light on the very foundations of gravity and String Theory.

This PRIN Project

*In order to pursue the proposed research lines, we have devised a combination of four research Units, which include leading experts who have often interacted in the past, although so far, they have effectively collaborated only to a limited extent. They have thus a common language, but possess independent skills to deal with **string constructions, supergravity, flux compactifications, integrable systems, black holes and branes and various aspects of Quantum Field Theory**. All of these, in our view, will be instrumental to grant this project the best chances of success.*

- Effective field theories for broken supersymmetry in String Theory.*
- Holographic models and dualities for non-supersymmetric field theories.*

- 1. Scuola Normale:**
 - A. Sagnotti (PI)
 - C. Angelantonj (U. Torino)
- 2. U. Milano Bicocca**
 - A. Tomasiello
 - A. Zaffaroni (local PI)
- 3. INFN – Milano**
 - A. Amariti (local PI)
 - D. Fioravanti (INFN-Bologna)
 - S. Klemm
 - A. Santambrogio
- 4. U. Padova**
 - G. Dall'Agata (local PI)
 - S. Giusto
 - L. Martucci

This PRIN Project

- **THE BUDGET :**

- ❖ Total MIUR contribution: 630 KE

- Scuola Normale: 162 KE [1 Post-Doctoral Fellow, 2020-22]
- U. Milano Bicocca: 157,5 KE [1 Post-Doctoral Fellow, 2020-22]
- INFN – Milano: 153 KE [1 Post-Doctoral Fellow, 2020-22]
- U. Padova: 157,5 KE [1 Post-Doctoral Fellow, 2020-22]

- **THE KEY WORDS: *COOPERATION* (and, whenever it will be needed or beneficial, *COLLABORATION*)**

- ❖ **JOINT SEMINARS in 2020:** 3 seminars by leading experts in one afternoon at:

- U. Milano Bicocca (January 31, 2020)
- U. Padova (March 20, 2020)
- INFN – Milano (May 15, 2020)

Thank You