"I have the chance to become this year a member of the CNRS within the LAPTh, as a Directeur de Recherche. This is to me an old dream becoming true. Indeed, already in high school, I became interested in theoretical physics of fundamental interactions. I remember some popular scientific works that led me to decide to try to become a researcher in this field. From there, I went to classes préparatoires, then to the École Normale Supérieure de Lyon, did a Ph.D. at UPMC Paris 6, and then 11 years of fixed term contracts in Europe, before being finally offered a permanent position. During my stays in Germany (LMU and MPI Munich, MPI Potsdam), in Switzerland (CERN Geneva) and in Austria (TU Wien), my wife joined me, followed then by two children. We all had nice experiences abroad, but we are eventually happy to be back to France, and in addition, to Rhône-Alpes where we come from.

By welcoming me and few other colleagues, the LAPTh is developing its activities on new topics, namely string and (formal) field theories. Doing so, the department benefits from new dynamics, and can match similar activities in the region as in Lyon or Geneva, allowing for new interactions and networks.

I am working more precisely in the field of string phenomenology. In this topic, one considers string theory as a fundamental theory able to describe nature, through the unification of forces, or equivalently through that of important physical theories, namely general relativity and quantum mechanics. Considering this way string theory as a starting point, we try to recover, or even predict, models that describe the world as we observe it, for instance the description of our universe via cosmology, or the infinitesimal world and particle physics. I am working more

precisely on relations to cosmology, and those turn out to be difficult to establish. Since approximately twenty years, we know, thanks to more and more precise observations, that our universe is expanding at an accelerated rate. This acceleration is due to a mysterious dark energy, whose origin remains unclear to us. Reproducing such a universe from a fundamental theory as string theory could help us understand this phenomenon. However, it seems for now that string theory strongly prefers different types of universes than ours, without us really understanding why. This could indicate that string theory is unable to describe our world, or simply that string theory solutions that would describe our universe in accelerated expansion are very difficult to find. There is thus some work left to do!"

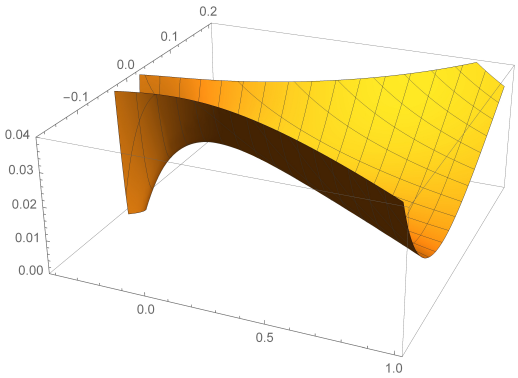

Illustration caption:

The point approximately in the center of the figure, that looks like a mountain pass, corresponds to a possible string theory solution reproducing a universe in accelerated expansion, like ours. This solution looks however unstable: as soon as one moves aside from this point, one rolls downhill further away from it. This universe would then probably change very quickly.

Taken from D. Andriot, P. Marconnet and T. Wrase, New de Sitter solutions of 10d type IIB supergravity, JHEP 08 (2020) 076 [arXiv:2005.12930]