# A new scenario for the formation of planetary atmospheres

All current models of atmospheric evolution ignore any external source of gas after the evaporation of the protoplanetary disk, which occurs at the very beginning of the system's lifetime (10 Myr at the latest).

However, thanks to intensive observations of dust disks, we now know that at least a quarter of all stars have a planetary belt (also known as a debris disk). These disks are formed by the collision of planetesimals, such as those in our own Kuiper belt (beyond Neptune).
Recently, a large amounts of gas have been discovered in a significant number of these disks. This was unexpected that gas was only present at the protoplanetary stage (<10 Myr).

This gas is thought to be released from volatiles contained in the solid bodies of debris disks. Since it was completely ignored in previous models, this new gas component co-existing with the planets could have a very important influence on the young planets that are already formed.

One of the most intriguing implications is the effect it could have on planetary atmospheres while gas is accreted from the disk. Although debris disks contain less gas than protoplanetary disks, they live on much longer. Therefore, planets can accrete a significant amount of it during the lifetime of the disk.
And even in the case of giant planets, there could be a change in their composition, since the gas that makes up the debris disk is very different from the original nebular gas (with a higher metallicity).
In order to predict the effect of this debris disk on the atmosphere of the solid and gaseous core, an analytical model has already been developed. The next step will be to simulate this accretion more accurately by adapting models previously developed for planetary accretion in protoplanetary disks.

The aim of this talk is to describe the context of this work and the main concept behind this simulation, including the inevitable problems that arise in practice and in adapting to the specific context of the debris disk.