Accretion is a process in which mass is transferred onto stars. For example, accretion occurs in a binary system, where two stars are close to each other. In these systems, the wind coming from one star can be gravitationally pulled and accreted by the other star. Accretion is one of the most important processes that shapes the universe around us. It allows new stars to be born, as well as shapes the look of black holes in the centers of distant galaxies. Because accretion is observed in a variety of objects, studying just one type of object with accretion can have a far-reaching influence on our understanding of the whole Universe.

White dwarfs are small remains of a dead star. However, they can be revived by a nearby star through accretion. Accreting white dwarfs can show many kinds of activity, such as classical nova outbursts. Classical nova outbursts are a manifestation of nuclear burning, which is seen in these white dwarfs for the first time since their progenitor stars died. The nuclear burning on these white dwarfs can only occur when enough mass is accreted. If conditions are right, accreting white dwarfs can accumulate so much matter that they cannot support its pressure and the white dwarf is destroyed in a supernova explosion.

I plan to study the way in which white dwarfs in binary systems are accreting mass. This will be done in two ways. The first approach will be indirect. Accretion is shaping the evolution of binaries. In particular, it influences the distribution of orbital periods. The orbital period is a time that takes one star to orbit the other. The exact value of the orbital period in a given binary depends on the mass accreted in the past, so the distribution of orbital periods can tell us a lot about the history of studied stars. I plan to observe a population of existing binary systems to obtain their orbital period distribution. As a result, through comparison with our theoretical models, the distribution of the orbital periods will tell us how much mass was accreted in the past.

The second approach to study accretion will be more direct. Since a lot of energy is released during accretion, its effects can be directly observed as a fast flickering of light coming from the accreting stars. Another survey will be done, this time of this flickering light coming from different kinds of binary stars with accreting white dwarfs. By doing this, we will know how flickering looks like when coming from binaries with different physical conditions. From this, we could imply how accretion behaves in different environments and physics standing behind it.