Skyrmions are topologically protected objects covering a number of physically very different phenomena. These objects, since they were discovered, have aroused the interest of magnetism area researchers, since they have new physical properties and point to potential technological applications. Among the mechanisms that generate skyrmion we have the Dzyaloshinskii-Moriya interaction and the perpendicular magnetic anisotropy. We study the skyrmions formation in cobalt nanodisks induced by these two mechanisms separately, using micromagnetic simulation by OOMMF open computational code. In our simulations, we use disks of 100 to 400 nm of diameter by 1 nm of thickness with and without the presence of topological defects. In the simulations with Dzyaloshinskii-Moriya interaction we vary the Dzyaloshinskii-Moriya interaction constant from 0 to 9 mJ/m² and in the simulations with perpendicular magnetic anisotropy we vary the anisotropy constant from 1000 to 1300 kJ/m³.

The results show that both mechanisms are capable of generating skyrmions, but of the different types. The Dzyaloshinskii-Moriya interaction induces the formation of skyrmion in the all disk sizes studied without the presence of defects, while with perpendicular anisotropy the skyrmions form for diameters above 250 nm. When defects are inserted into the disks the skyrmions are annihilated for both systems. However, the formation of skyrmions under the influence of anisotropy is greatly affected.