High entropy alloys are a relatively new class of materials that have gained significant attention in materials science and engineering. Unlike tradicional alloys, HEAs are composed of multiple elements in roughly equal proportions, typically four or more. The unique feature of HEAs is their high configurational entropy, with is the measure of disorder or randomness in the arrangement of atoms. HEAs can be composed of a wide range of elements, including transition metals, refractory metals, and nonmetals. This diverse composition makes them versatile for various applications. The large number of elements in nearly equal proportions results in a high degree of entropy, promoting a random atomic structure. This randomness can lead to unique mechanical and physical properties. HEAs often exhibit remarkable mechanical properties, such as high strength, hardness, and ductility. These properties make them suitable for use in aerospace and automotive applications. Some HEAs have demonstrated excellent resistance to corrosion and oxidation, making them attractive for use in harsh environments. By adjusting the composition of the alloy, it's possible to tailor the properties of HEAs to meet specific requirements, making them highly customizable. HEAs continue to be an active area of research, with scientists exploring their potential applications in fields like energy storage, electronics and more. It's important to note that HEAs are a relatively new and evolving field, and research is ongoing to fully understand their properties and optimize their performance for various applications.

The properties of plastic deformation mechanisms of metallic materials have long been one of the main scientific interest in the field of materials science and engineering. These properties greatly affect the selection of an appropriate type of thermo-mechanical processes in order to obtain the required characteristics of materials. Quite recently, a group of detwinning mechanisms were found to operate in face-centered cubic metallic materials, particularly also in high- and medium-entropy alloys, which is a highly investigated group of materials. Thus, it is very important to further study the properties of the detwinning mechanisms in this group of materials. Taking all this into account, the main scientific goal of this project is to investigated the properties of detwinning mechanisms of face-centered cubic deformation twins activated in high- and medium-entropy alloys.

In conclusion, this project, using large single crystals, will investigate the basic properties of newly discovered mechanism of plastic deformation observed in high- and medium-entropy alloys allowing to answer some of the fundamental scientific questions regarding the mechanical properties of these materials. These experimental results should also provide new insights in the field of plasticity and texture development of face-centered cubic high- and medium-entropy alloys.