*23rd International School on Condensed Matter Physics, 26-30.08.2024, Varna, Bulgaria*
*"Recent Progress in Advanced Materials and Applications"*

# The analytical investigation of star polymers and copolymers in confined geometries

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The analysis of the influence of star polymer and copolymer topology on the depletion interaction potentials and the depletion forces was carried out analytically. The method of calculation of the dimensionless depletion interaction potentials and the dimensionless depletion forces for a dilute solution of ideal star polymers with f=3, 5 legs and copolymer star constituted by two different species of polymers with $f_1+f_2$ legs in a Θ - solvent confined in a slit geometry of two parallel walls with repulsive surfaces and for the case of one repulsive and the other inert surface was proposed. We performed the investigation of following cases of copolymers: $f_1=2$, $f_2=1$ and $f_1=1$, $f_2=3$. Furthermore, the dimensionless depletion interaction potentials and the dimensionless depletion forces for ideal star polymers and copolymers with different number of legs immersed in a dilute solution of big colloidal particles with different adsorbing or repelling properties in respect to polymers were calculated, bearing in mind the Derjaguin approximation. The obtained analytical results for star polymers and copolymers are compared with the results for linear polymers in confined geometries. The acquired results show that a dilute solution of star polymers and copolymers can be applied for the production of new functional materials because the behavior of these solutions is strictly correlated with the topology of polymers, and also with the nature and geometry of confined surfaces. The above mentioned properties can find practical application in nano - technology, as well as in biotechnology and medicine for drug and gene transmission.