

Research program

MACHINES FOR MANUFACTURING FIBER AND NANOFIBER STRUCTURES

Research and development of new advanced structures of textile machines. Applied research of controlled drives and mechatronic elements in machine design. Theoretical and experimental research of dynamic properties of high-speed mechanisms of machines and equipment with material, shape and structural optimization of selected machine subsystems in terms of their impact on production processes. Research in the field of spinning machines, machines for production of felt headgear, sewing machines, winding and unwinding systems of machines. Research and development of new machinery and production lines for production of linear, flat and spatial nanofibrous formations. Focus of research activities on spinning technologies under the influence of electric current (AC and DC electrospinning) and the effect of centrifugal forces (force spinning).



Research activities

MACHINES AND EQUIPMENT FOR MANUFACTURING OF FIBER STRUCTURES

- ▶ Machinery and equipment for the preparation of semi-finished products for the manufacture of felt products with a focus on machines and equipment for the technology of felting, fulling and other finishing operations, technologies and equipment for the preparation of a rabbit hair sliver.
- ▶ High speed yarn winding and unwinding system for spinning machines. Research process of ballooning yarn.
- ▶ Research and development of sewing machine mechanisms using controlled drives and mechatronic elements, development of nodes of sewing machines and single-purpose sewing machines.
- ▶ Research and development of winding and unwinding systems of fiber structures including the process of construction of winding.
- ▶ Development of new machine structures enabling a higher level of process automation.
- ▶ Modeling and simulation of mechanical nodes and mechatronic systems of machines, investigation of technological processes through modeling and simulation of physical fields and with the support of experimental development.

MACHINERY AND EQUIPMENT FOR MANUFACTURING OF NANOFIBER STRUCTURES

- ▶ Research and development of technologies, new machinery and operating lines for production of linear, surface and spatial nanofibrous structures under the influence of electric current (mostly AC electrospinning).
- ▶ Research and development of technologies and equipment for production of linear, areal and spatial nanofibrous structures by centrifugal forces.
- ▶ Research, development and optimization of subsystems of machines and equipment for preparation of nanofibrous materials for biomedical, hygienic, filtration, etc. applications.
- ▶ Theoretical and experimental analysis of spinning process, electrostatic field intensity simulation and other phenomena in spinning process.