

Start Cup International Award (7.500 €)

PROJECT NAME	Three-Layered Fabry-Perot Interference Filters
TEAM DESCRIPTION	Team members have an operational experience in the field of thin-film technologies and technologies of an ion-plasma sputtering, spectroscopy and optical filters, optical interference profilometry, scanning probe and electronic microscopy, optical and electron beam lithography, the microsystem (MEMS) technics and microfluidics, carried out scientific researches in these areas in laboratory of Physics-technological Institute of the Russian Academy of Sciences (FTIAN), in laboratory «processes and materials for micro and nanotechnologies» of Politecnico di Torino, and also in the leading French center of innovations in micro and nanotechnologies MINATEC. Members of a command have experience of participation in research and development performance, experience of performance of joint projects is more than 5 years.
FIELD OF APPLICATION	<ul style="list-style-type: none"> • Tunable interference filters for diagnostics of quality of a films surfaces and thin-film technologies • Elements of fiber-optical networks of data transmission without intermediate transformations, in multiplexers and demultiplexers of synchronous digital fiber-optical networks • Dispersive elements of spectrometers • Sensors and measuring devices (temperature gages, mechanical tension and deformation sensors) • Biomedical application: sensors for blood temperature and pressure measurements
PROJECT DESCRIPTION	The new variant of realization of the narrow-band optical Fabry-Perot filter on the basis of three-layer nanostructures is offered. Apparently, in the developed filter layers of inexpensive materials are used. Process of thin-film deposition is well-known and allows receiving interference filters with the set characteristics in short terms.
INNOVATIVE FEATURES	One of the innovative features of the developed filter is its simple design representing thin three-layer structure aluminum – silicon dioxide – aluminum on the basis of glass substrate.
ADVANTAGES	The offered implementation of Fabry-Perot interference filter has several advantages over existing analogs. The technology used allows receiving the necessary thin-film structures possessing small dimensions and a set of spectral characteristics, allowing to receive the high resolution, and to create on their basis high-precision devices and microelectromechanical systems (MEMS).
CURIOSITY	In a filter design, aluminum is used as a high absorbing material. Having proper thickness of aluminum layers in offered structure, very high reflection coefficient of the mirrors can be obtained (based on anomalous behavior of physical parameters) which result in significant increasing of spectral resolution.