

## Ultra-short of pico and femtosecond soliton laser pulse using microring resonator for cancer cells treatment

### Abstract

A system of microring resonators (MRRs) incorporating with an add/drop filter system is presented in which ultra-short single and multi temporal and spatial optical soliton pulses can be simulated and used to thermalbased killing of abnormal cells, tumor and cancer, applicable in nanomedical treatments. This proposed system uses chaotic signals generated by a bright soliton pulse within a nonlinear MRRs system. Interaction between gold nanoparticles and ultra-short femtosecond and picosecond laser pulses holds great interest in laser nanomedicine. By using the appropriate soliton input power and MRRs parameters, required spatial and temporal signals are generated spreading over the spectrum. Results obtained show that smallest single temporal and spatial soliton pulse with FWHM = 712 fs and FWHM = 17.5 pm could be generated respectively. The add/drop filter system is used to generate high capacity ultra-short soliton pulses in the range of nanometer/second and picometer/second.