

An invention allows the use of a superheterodyne parametric free electron laser with a longitudinal electric undulator as a generator or an electromagnetic signals amplifier, including, in the technological systems of the commercial purpose, in particular in the systems built on principle of stimulation of chemical reactions by laser radiation, and systems of laser cutting and materials welding. The superheterodyne parametric free electron laser (SPLFE) with the longitudinal electric undulator contains an input part 1 of an electrodynamics system of electromagnetic signal, a source 2 of relativistic electron beam (as part of an electron injector and an acceleration installation), a vacuum channel 3 with electronic beam, a pumping system 4, an amplifier 5 of combination electronic wave in form of longitudinal electric undulator, input and output parts 1, 6 of the electrodynamics system of electromagnetic signal and an electronic commutator. The source 2 of relativistic electron beam is connected to the vacuum channel 3 of electronic beam, which is connected to an electronic commutator 7. An amplifier 5 of combinational electronic wave is located in a working volume of the pumping system 4 so that they did not shade working volumes of input and output parts 1, 6 of the electrodynamics systems of electromagnetic signal and electronic beam in the vacuum channel 3. The invention allows reduction of dimensions, simplification of a design, reduction of manufacturing and operation cost, improvement of technological and commercial adequacy to conditions that are characteristic for peacetime industries, such as the chemical industry or mechanical engineering.