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Quesiti prova orale - BUSTA 2

- Il candidato descriva almeno due metodi di regolarizzazione dei parametri utilizzati per l'apprendimento nelle deep neural network.
- Il candidato descriva gli organi di governo dell'Istituto TeCIP.
- Il candidato descriva il funzionamento del meccanismo di interrupt nei calcolatori.

7.2 Fundamentals of Parametric Mixers

Optical parametric mixing encompasses a collection of nonlinear processes in which, the energies (as well as momenta) of the participating photons are re-distributed but not transferred to the medium. Due to the passive role of the medium, parametric mixing is the only known mechanism that provides direct access to participating photon characteristics (in terms of number, energy and polarization) since the overall states of the photons are conserved in the process. This also means parametric mixing can possess an arbitrarily-wide spectral coverage (bandwidth), which is solely limited by the transparent window of and potential multi-photon resonant processes in the medium. Furthermore, unlike stimulated-emission processes in which the finite upper-state lifetime delays the mixing response, the absence of (meta-)stable state in parametric mixing processes gives rise to its ultrafast response.

Parametric mixers of interest in this chapter are based on four-photon mixing (FPM) processes mediated by the third-order nonlinear response. A simple four-photon mixer annihilates two photons, typically from a single or two frequency-distinct pump waves, to create two photons that coincides the energy of the remaining participating waves. This photon-exchange mechanism leads to a number of important phenomena, including optical amplification, generation, and frequency conversion [21–23]. Specific wave dynamics of a parametric mixer are primarily governed by the pump configurations and the corresponding phase-matching conditions, as revealed in the following sections.