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**Cavity phase matching for a high efficient sheet optical parametric oscillator** Z.D. XIE, X.J. LV, S.N. ZHU, Department of Physics, Nanjing University — Cavity phase matching (CPM) was first proposed in the early days in nonlinear optics by J. A. Armstrong, N. Bloembergen, J. Ducuing and P. S. Pershan in theory in 1962 as one of the three protocols to realize phase matching in nonlinear medium. The other two protocols have been developed into the well-known quasi-phase matching (QPM) technique. CPM has equivalent capability to compensate for the phase mismatching as QPM in principle and people has been attempting to achieve CPM in several kinds of semi-conductor materials. However, there is no convincing experimental realization up to date. In the work, we manufactured, for the first time, a CPM optical parametric oscillator (OPO) which consisted of a  $217\mu\text{m}$  thick KTP crystal sheet whose two surfaces were optically coated for the resonance recirculation of signal and idler. The sheet OPO could emitted the near-frequency-degenerate signal and idler beams in near-infrared region with a quasi-continuously tunable frequency difference ranging from 0.35 to 26.1 THz. This mini-device showed the high slope efficiency up to 22%, and as well the unique spectral and spatial features, like single-longitudinal-mode, single-spatial-mode, narrow linewidth, etc.

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