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This work is related to the design of *carbo*-meric chromophores with large two-photon absorption efficiency, a third order non-linear optical process with numerous (biomedical) applications (higher contrast imaging, photodynamic therapy, …) [1].

The high computational cost of the calculation of two-photon absorption cross-sections (σ_{2PA}) makes exploratory studies difficult. A low-cost approximate calculation method would be desirable for a crude selection among the wide range of possible experimental targets, and thus for saving the performance of high level calculation [2] for promising chromophores only.

A two-form two-state Valence Bond (VB) model, early used to predict and analyze quadratic non-linear responses [3], can be transposed to a three-form three-state VB model to estimate σ_{2PA} cross-sections from the weights of zwitterionic mesomeric forms resulting from the charge transfer related to the cubic non-linear optical response [4].

The method will be illustrated for quadrupolar *carbo*-benzenes [5] and the possibility for substituting the weights of the mesomeric forms obtained from VB theory by the ones obtained from topological analysis of the electron localization function (ELF) [6] will be discussed.