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Title:	Pseudo-Dirac neutrinos from flavour dependent CP symmetry
Authors:	Joshipura, A.S. (/jspui/browse?type=author&value=Joshipura%2C+A.S.) Patel, K.M. (/jspui/browse?type=author&value=Patel%2C+K.M.)
Keywords:	CP violation Discrete Symmetries Neutrino Physics
Issue Date:	2018
Publisher:	Springer Ltd
Citation:	Journal of High Energy Physics, 2018(7)
Abstract:	Discrete residual symmetries and flavour dependent CP symmetries consistent with them have been used to constrain neutrino mixing angles and CP violating phases. We discuss here role of such CP symmetries in obtaining a pseudo-Dirac neutrino which can provide a pair of neutrinos responsible for the solar splitting. It is shown that if (a) 3 × 3 Majorana neutrino matrix Mv is invariant under a discrete Z2 × Z2 symmetry generated by S1,2, (b) CP symmetry X transform Mv as XTMvX = M * v , and (c) X and S1,2 obey consistency conditions XS *1,2 X† = S2,1, then two of the neutrino masses are degenerate independent of specific forms of X, S1 and S2. Explicit examples of this result are discussed in the context of Δ(6n2) groups which can also be used to constrain neutrino mixing matrix U. Degeneracy in two of the masses does not allow complete determination of U but it can also be fixed once the perturbations are introduced. We consider explicit perturbations which break Z2 × Z2 symmetries but respect CP. These are shown to remove the degeneracy and provide a predictive description of neutrino spectrum. In particular, a correlation sin 2θ23 sin δCP = ±Im[p] is obtained between the atmospheric mixing angle θ23 and the CP violating phase δCP in terms of a group theoretically determined phase factor p. Experimentally interesting case $\theta 23=\pi 4, \delta CP=\pm\pi 2$ emerges for groups which predict purely imaginary p. We present detailed predictions of the allowed ranges of neutrino mixing angles, phases and the lightest neutrino mass for three of the lowest Δ(6n2) groups with n = 2, 4, 6.
URI:	https://link.springer.com/article/10.1007/JHEP07(2018)137 (https://link.springer.com/article/10.1007/JHEP07(2018)137) http://hdl.handle.net/123456789/1977 (http://hdl.handle.net/123456789/1977)
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