Title:	Clockwork mechanism for flavor hierarchies
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Keywords:	fermion Nf pairs vectorlike fermions
Issue Date:	2017
Publisher:	APS
Citation:	Physical Review D, 96 (11)
Abstract:	We incorporate a clockwork mechanism into the standard model flavor sector and show that the observed pattern of fermion masses and mixing can be obtained without any unnaturally small or large parameter in the fundamental theory. By introducing Nf pairs of vectorlike fermions, as clockwork gears, for each generation of the standard model fermions and setting up a characteristic clockwork potential, it is shown that the intergenerational mass hierarchies are determined by Nf. For a given type of fermions, strong or mild hierarchy in the masses and mixing parameters can be obtained by taking the large or small value of Nf. The mechanism is shown to lead to a generalized version of the Froggatt-Nielsen mechanism as an effective description.
URI:	https://journals.aps.org/prd/abstract/10.1103/PhysRevD.96.115013 (https://journals.aps.org/prd/abstract/10.1103/PhysRevD.96.115013) http://hdl.handle.net/123456789/1703 (http://hdl.handle.net/123456789/1703)
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