1. Record Nr.   UNINA9910300419703321

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   Titolo   Double Chooz and Reactor Neutrino Oscillation : _13 Improvement
                       and First Effective m^2_31 Measurement / / by Thiago Junqueira de
                       Castro Bezerra

   Pubbl/distr/stampa Tokyo : , : Springer Japan : , : Imprint : Springer, , 2015

   ISBN   4-431-55375-4

   Edizione   [1st ed. 2015.]

   Descrizione fisica 1 online resource (202 p.)

   Collana   Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-
                       5053

   Disciplina   539.7215

   Soggetti   Elementary particles (Physics)
                       Quantum field theory
                       Particle acceleration
                       Astrophysics
                       Elementary Particles, Quantum Field Theory
                       Particle Acceleration and Detection, Beam Physics
                       Astrophysics and Astroparticles

   Lingua di pubblicazione   Inglese

   Formato   Materiale a stampa

   Livello bibliografico   Monografia

   Note generali   Description based upon print version of record.

   Nota di bibliografia   Includes bibliographical references at the end of each chapters.

   Nota di contenuto   Introduction -- Neutrino Oscillation -- The Double Chooz Experiment
                       -- Double Chooz Data -- Measurement of Neutrino Oscillation
                       Parameters -- Conclusion.

   Sommario/riassunto This book is based on the author's work at the Double Chooz
                       Experiment, from 2010 to 2013, the goal of which was to search for
                       electronic anti-neutrino disappearance close to nuclear power plant
                       facilities as a result of neutrino oscillation. Starting with a brief review
                       of neutrino oscillation and the most important past experimental
                       findings in this field, the author subsequently provides a full and
                       detailed description of a neutrino detector, from simulation aspects to
                       detection principles, as well as the data analysis procedure used to
                       extract the oscillation parameters. The main results in this book are 1)
                       an improvement on the mixing angle, 13, uncertainty by combining
                       two data-sets from neutrino event selection: neutron capture on
                       gadolinium and on hydrogen; and 2) the first measurement of the

effective squared mass difference by combining the current reactor neutrino experimental data from Daya Bay, Double Chooz and RENO and taking advantage of their different reactor-to-detector distances. The author explains how these methods of combining data can be used to estimate these two values. Each method results in the best possible sensitivity for the oscillation parameters with regard to reactor neutrinos. They can be used as a standard method on the latest data releases from the current experiments.