

PACKAGE ID - 001043CY00100 BACON12

KWIC TITLE - Bounce-Averaged Fokker-Planck Code

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LIMITATION CODE -UNL **AUDIENCE CODE** - UNL

COMPLETION DATE - 10/06/1988 **PUBLICATION DATE** - 04/01/1988

DESCRIPTION - BACON12 solves the Fokker-Planck equation for electron or ion distribution, $f(v,\theta)$, confined in an electrostatic and magnetic well, where (v,θ) are spherical velocity coordinates with θ measured with respect to the static magnetic field. It was developed to model ions trapped in a magnetic mirror. The influences of Coulomb collision, radio frequency heating, and neutral beam injection are included. The code calculates the particle and energy confinement time of particles confined in a magnetic well. BACON12 is written in conservation form, which results in the line density being conserved exactly except at phase space boundaries.

PACKAGE CONTENTS - NESC Note 88-110; Software Abstract; UCID-20474; User Guide for Bounce Average Code; Meda Includes Source Code, Sample Problem Input and Output;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 Tape

METHOD OF SOLUTION - The Fokker-Planck equations are averaged over the bounce motion of the particles along the static magnetic field. The equations are finite differenced, and the resulting matrix is inverted using a 9-point incomplete Cholesky conjugate gradient (ICCG) method. The Rosenbluth potentials for the computed species are obtained by expanding the distribution function in Legendre functions.

COMPUTER - CRAY1

OPERATING SYSTEMS - CTSS

PROGRAMMING LANGUAGES - LRLTRAN (CIVIC)

SOFTWARE LIMITATIONS - Maximum of 4 sources

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - BACON12 is a major modification of the bounce-averaged Fokker-Planck code of Cutler, Pearlstein, and Rensink. The notation and procedure for writing the code in conservation form closely follow the square well code, HYBRID2, and

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RELATED SOFTWARE - (CONT) the bounce-averaged code, CQL. SMOKE, which solves similar problems, is a finite element code which allows multiple phase space regions and includes relativistic effects.

OTHER PROG/OPER SYS INFO - BACON12 calls several routines specific to the LLNL computing environment; these routines are not included.

REFERENCES - T.D. Rognlien, Conversion of the Bounce-Averaged Fokker-Planck Code to Conservation Form, UCID-20474, July 1, 1985; Tim Cutler, User Guide for Bounce Average Code, Lawrence Livermore National Laboratory Memorandum, May 21, 1980; BACON12, NESC No. 9534, BACON12 Tape Description, National Energy Software Center Note 88-110, August 22, 1988.

ABSTRACT STATUS - Abstract first distributed August 1988. Cray1 version submitted April 1988.

SUBJECT CLASS CODE - X

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
FOKKER-PLANCK EQUATION
MINIMUM-B CONFIGURATIONS
RF SYSTEMS
CYCLOTRON HARMONICS
B CODES

EDB SUBJECT CATEGORIES -

990200 700330

SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS