The Aleph Interface For Jetset 7.3

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1 Introduction

This document describes the interface now available through which events can be generated under KINGAL via Jetset 7.3, producing event banks that can be accessed by GALEPH, JULIA, ALPHA and DALI.

2 Motivation

Jetset 7.3 is the latest version of the LUND event generator, and replaces all previous versions, which are now obsolescent. Some of the physics processes missing from Jetset 6.3, and only implemented rather awkwardly via DYMU03, are now standard. For example parton-showering is the default method of event development, and no longer requires the writing of colour lines and explicit calls to LUSHOW. Very importantly, final state radiation is an intrinsic part of the showering process, with photons coming from quark-lines in competition with gluons, whereas in DYMU03 the photon was always the most prompt particle, its energy derived directly from the centre of mass energy.

3 Particle Data

The data for the Aleph standard particles is read into the program, but may be modified by cards. Some new code ensures that the printed-out particle data table is what is used everywhere in the program: the 5 standard quark masses are exceptions to this because the Aleph standard values (0) are not possible in Jetset 7.3. Default values for the masses of the Z0, Higgs and top-quark, respectively 91.2, 100., 100., supercede the standard values, but can still be changed by cards. Note that the flavour codes of Jetset 7.3 (and their data-access via a compressed code) are completely different from those of Jetset 6.3, but are (mostly) what is recommended by the particle data group. In cases where the new Jetset code is a five digit number, with zero as the second most significant digit (eg 20213 which is the A1 meson) the zero is suppressed internally and in the printed table (leaving 2213 for the A1 etc). No ambiguities result from this. Extra particles are added from the Jetset 7.3 up to the code 6554: this gives hadrons containing 0 or 1 t-quark. The extra mesons are mostly J=2, but see the printed-out table for details; requests for extra mesons, or for the implementation of Alephlib routines KXLUBR, KXLUTO (currently unavailable for Jetset 7.3) should be addressed to ALWS::MEDCALF. Very comprehensive decay modes exist in Jetset 7.3, so that for instance the LUNMOD routines are no longer necessary (and won't work).

4 B mixing

The heavy-flavour code used in DYMU03 is retained, with the flavour-codes translated, and is believed to work in an identical manner, but should be checked by heavy-flavour experts.

5 Driver Cards

Cards needed to drive the program are exactly the same as LUND02, with the exception of particle data changing cards. These take the forms
LLLL number / number or
LLLX number / number
where L is a letter, and LLLL is one of MSTU, PARU, MSTJ, PARJ, PARF, BRAT, and where X is a number and LLLX is one of KCH1,KCH2,KCH3,PMA1,PMA2,PMA3,PMA4, MDC1,MDC2,MDC3,MDM1,MDM2,KFD1,KFD2,KFD3,KFD4,KFD5. The first form changes Jetset 7.3 parameters of the same name, eg
MSTJ 41 / 2
changes MSTJ(41) to 2 (from the default value 1) thus turning on final state radiation. The second form changes Jetset 7.3 parameters in 2-dimensional arrays beginning with the 3 letters and indexed by the number, eg
PMA1 23 / 91.18 changes the Z0 mass to 91.18, because 23 is the Jetset 7.3 code for the Z0 and PMAS(LUCOMP(23),1) is the location at which this value is stored; the use of LUCOMP where appropriate is user-transparent. See the Jetset 7.3 manual for details of all the parameters, but some of the most useful are documented on the example driver cards LUND07.

6 Where to Find Jetset 7.3

Offline Cluster:
the relevant files are in ALWS::KIN:, they are
LUND73.FOR, LUND73.HLB, LUND73.OBJ, LUND73.OLB, LUND73.RUN, LUND07.CARDS, KXMIX7.OBJ, JETSET73.OLB and JETSET73.MANUAL (the manual will not be kept permanently).
Use of KINRUN : select

generator name	KIN:LUND73
data cards	KIN:LUND07.CARDS (or your own copy)
extra event generator	KIN:JETSET73/LIB/INCLUDE=LUDATA
list of .OBJ file	KIN:KXMIX7.OBJ

do not use modified LUND, but use RNAMAR.
CERNVM:
the relevant files are on the UPHY disk; LUND73 CARDS, LUND73 TXTLIB and JETSET73 TXTLIB. The JETSET73 MANUAL can be found on TORSJO 192. As yet the program cannot be accessed via KINRUN EXEC. Use the LUND73 EXEC on BOYLE 191, which is an effective KINRUNT EXEC.