

LISE++ version 9.4.52

From 28.10.2012

The code operates under MS Windows environment and provides a highly user-friendly interface.
It can be freely downloaded from the following internet addresses:

<http://lise.nsci.msu.edu>

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NRV - Low Energy Nuclear Knowledge Base (Dubna)

nrv.jinr.ru/nrv/

Nuclear Reactions Video

Low Energy Nuclear Knowledge Base

Supported by Russian Foundation for Basic Research

Nuclear Properties	Nuclear Models	Nuclear Decays	Nuclear Reactions
<p>Nuclear Map</p>	<p>Shell Model</p>	<p>Alpha - decay</p>	<p>Elastic scattering Classical Semiclassical Optical Model</p> <p>Experimental Data $d\sigma/d\Omega$</p>
<p>Check your Browser Settings</p>	<p>Liquid Drop Model</p>	<p>Beta - decay</p>	<p>Inelastic Scattering Coulomb excitation Direct process (DWBA) Channel coupling Deep inelastic collision</p>
<p>Warning! NRV extensively uses Java. Your browser must support Java Virtual Machine</p>	<p>Two-Center Shell Model</p>	<p>Fission</p>	<p>Transfer reactions: Direct process (DWBA) Semiclassical approach (GRAZING code) 3-body classical model Two-nucleon transfer Massive transfer</p>

it's diffused freely



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v. 9.4.52

SIMULATION OF FRAGMENT SEPARATORS

Range of application

The program **LISE++** has been developed to calculate the transmission and yields of fragments produced and collected in a spectrometer. This code allows to simulate an experiment, beginning from the parameters of the reaction mechanism and finishing with the registration of products selected by a spectrometer. The program allows to quickly optimize the parameters of the spectrometer before or during the experiment. It also makes it possible to estimate and work in conditions of maximum output of studied reaction products and their unambiguous identification. Wedge and Wien filter selections are also included in the program.

LISE++ is the new generation of the **LISE** code, which allows the creation of a spectrometer through the use of different "blocks". The number of blocks used to create a spectrometer in **LISE++** is limited by operating memory of your PC and your imagination.

built-in Energy loss, Time-of-Flight, Position, Angular, Charge, Cross-Section distribution plots and dE-E, dE-TOF, Z-A/Q and dE-X two-dimensional plots allow to visualize the results of the program calculations. An application of transport integral lies in the basis of fast calculations of the program for the estimation of temporary evolution of distributions of phase space.

The **LISE** code may be applied at medium-energy and high-energy facilities ([fragment- and recoil-separators with electrostatic and/or magnetic selections](#)). A number of these facilities, like **A1900** and **S800** at NSCL, **LISE3**, **SISSI/LISE3** and **SPEG** at GANIL, **FRS** and **SuperFRS** at GSI, **RIPS** and **BigRIPS** at RIKEN, based on the separation of projectile-like and fission fragments, fusion residues are included or might be easily added to the existing optical configuration files.

The **Projectile Fragmentation**, **Fusion-Evaporation**, **Fusion-Fission**, **Coulomb Fission**, and **Abrasion-Fission** assumed in this program as the production reaction mechanism allows to simulate experiments at beam energies above the Coulomb barrier.

Built-in powerful tools:

- «Physical Calculator»,
- «Relativistic Kinematics Calculator»,
- «Evaporation Calculator»,
- «Spectroscopic calculator" (of J.Kantele»,
- «Matrix calculator",
- «PACE4» (fusion-evaporation code),
- «Global» (charge-state distribution code),
- «Charge» (charge-state distribution code),
- Nuclide and Isomeric state Databases utilities,
- Units converter,
- ISOL catcher,
- Twinsol (solenoid) utility,
- Transport calculations,
- Brho analyzer,
- Stripper foil lifetime utility (new),
- Monte Carlo simulation of fragment transmission (new),
- Monte Carlo simulation of fission fragment kinematics,
- «BI» - the automatized search of two-dimensional peaks in spectra and definition of their characteristics

permit to work well below this energy limit, and this makes the program **very attractive for all users dealing with physics of heavy ions** from 10 keV up to some GeV per nucleon.

- LISE++ presentation on EBSS2011 - PDF (1.6 MB)
- LISE++ first steps - PDF (EBSS2011-tutorial)
- LISE++ status (2008) - PDF (1.8 MB)
- LISE++ presentation (2007) - PowerPoint (4.3 MB)
- LISE++ presentation (2004) - PowerPoint (4 MB)
- LISE++ Coulomb fission - PowerPoint (3 MB)
- LISE++ Abrasion-Fission - PowerPoint (3 MB)
- LISE++ site statistics (16 Nov 2011)

partner site



Low Energy Nuclear Knowledge Base



Fusion -> Residual

Evaporation settings

Transmission probability for a one-dimensional potential barrier

Classical

Quantum-mechanical

h_omega - Curvature parameter of the parabolic potential describing the barrier (default value 3 MeV) MeV

Probability for compound nucleus formation $P_{\{CN\}}$

Take into account the Probability for compound nucleus formation $P_{\{CN\}}$ according to V.Zagrebaev & W.Greiner, PRC78, 034610 (2008)

Partner site

[Fusion](#)

[Evaporation](#)

OK Cancel Make default Help

Kinematics calculator (relativistic)

Reactions

TWO BODY reaction B (A , C) D

SCATTERING B (A , C=A) D=B

BREAKUP (FISSION) x (A , C D) x (gamma-emission)

Use Mott's scattering

For Kinematics Plots use energy values

after reaction

at entrance of detectors

Kinematics plots

Rutherford plot

2D fragment plot (Monte Carlo)

[3-body kinematics](#)

Quit Help

Participants

		ME [MeV]	Excitation Energy	E[CM] = 1018.16 MeV
A	Beam	40Ar	-35.04	0
B	Target	9Be	11.35	0
C*	Fragment	40Ar	-35.04	0
D*	Residual	9Be	11.35	0

Beam energy = 140.0 MeV/u
Intensity = 1 pA
Target thickness = 1e-1 micron
Q-value = 0.00 MeV

Reaction takes place at the

ENTRANCE of the target MIDDLE of the target EXIT of the target

Set-up

Search an angle in CM

from 0 degrees and up

from 180 degrees and down

	fragment (C)	residual (D)
R =	100 cm	100
w =	1 cm	1
h =	2 cm	2

Angle (deg) = 8.439 62.885 50 130

	fragment (C)	residual (D)	fragment (C)	residual (D)
Counting in monitor =	1.13e-2	5.1e-4		
Differential Cross Section =	7.29	0.33	0.203	0.203
Energy after reaction =	124.55	68.51	4.864	91.41
Energy at the entrance of detectors =	124.55	68.51	MeV/u (** for gamma [MeV])	
Maximum Angle =	13.03	90.00		
Solid Angle =	0.2	0.2	7.17	0.325
delta Theta =	0.57	0.57	3.9	1.1

Calculations

LAB CM

pps

mb/sr

MeV/u**

deg

m sr

deg

Fusion -> Residual

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+ Future link from the Two-body reactions dialog