

Отделение физики высоких энергий ПИЯФ  
**ОСНОВНЫЕ НАПРАВЛЕНИЯ НАУЧНОЙ ДЕЯТЕЛЬНОСТИ**  
**1971–1996**

Научные редакторы: Г.Д.Алхазов, А.А.Воробьев, Ан.А.Воробьев,  
И.В.Лопатин, Г.Е.Солякин, В.А.Щегельский.

Компьютерное оформление: И.В.Лопатин

High Energy Physics Division PNPI  
**MAIN SCIENTIFIC ACTIVITIES**  
**1971–1996**

Scientific editors: G.D Alkhazov, A.A.Vorobyov, An.A.Vorobyov,  
I.V.Lopatin, G.E.Solyakin, V.A.Schegelsky.

Computer design: I.V.Lopatin

F.G.Lepekhin, B.B.Simonov.

**Correlations of particles in interactions of relativistic hadrons and nuclei  
with photoemulsion nuclei** ..... 259

### 3. SOLID STATE PHYSICS

S.G.Barsov, V.P.Koptev.

**Studies of magnets and superconductors by muon spin rotation method** ..... 269

V.A.Gordeev.

**"Anomalous" muonium in semiconductors** ..... 281

### 4. APPLIED INVESTIGATIONS

N.K.Abrossimov, D.L.Karlin, B.A.Konnov, V.I.Lazarev, L.A.Melnikov, G.A.Riabov,  
D.M.Seliverstov.

**Proton therapy at PNPI synchrocyclotron** ..... 295

V.M.Zaitsev, E.G.Alekseev, V.S.Guselnikov, T.V.Koneva.

**Radiopharmaceutical chemistry at PNPI synchrocyclotron** ..... 304

V.M.Samsonov, A.I.Smirnov, A.V.Khazadeev.  
**Crystaloptics of high energy particles** ..... 129

A.E.Shevel, N.Lodkin, A.A.Oreshkin.  
**Centralized computer resources in experiments on high energy physics** ..... 140

## 2. NUCLEAR PHYSICS

G.D.Alkhazov, S.L.Belostotsky, A.A.Vorobyov, G.A.Korolev, D.M.Seliverstov,  
A.V.Khazadeev.  
**Proton diffraction scattering on nuclei and nuclear matter  
distributions** ..... 151

G.N.Velichko, A.A.Vorobyov, G.A.Korolev, S.I.Manayenkov, A.V.Khazadeev.  
**Elastic diffraction scattering of hadrons on the lightest nuclei** ..... 162

Yu.V.Dotsenko, A.A.Vorobyov.  
**Study of nuclear structure with quasielastic proton scattering at 1 GeV** ..... 172

S.L.Belostotski, O.G.Grebenyuk, O.V.Miklukho, V.N.Nikulin.  
**Study of deuteron structure in exclusive breakup reactions** ..... 182

Yu.N.Novikov, V.N.Panteleev, V.I.Tikhonov.  
**The IRIS facility and nuclear-spectroscopic investigations of nuclides far  
from the beta-stability region** ..... 192

G.D.Alkhazov, A.E.Barzakh, V.P.Denisov, I.Ya.Chubukov.  
**Investigation of spins, electromagnetic moments and charge radii  
of radioactive nuclei by laser spectroscopy** ..... 203

A.A.Vorobyov, E.M.Maev, G.G.Semenchuk.  
**Muon catalized *dd*- and *dt*-fusion** ..... 210

A.A.Vorobyov, D.M.Seliverstov.  
**Ternary fission** ..... 222

V.P.Koptev, E.M.Maev, M.M.Makarov, A.V.Khazadeev.  
**Charge exchange scattering of 1 GeV protons by nuclei** ..... 233

A.V.Kravtsov, G.E.Solyakin.  
**Two- and three-body collinear disintegrations of heavy nuclei  
at moderate excitation energies** ..... 243

V.P.Chizhov.  
**Experiments at PNPI electron synchrotron** ..... 251

## CONTENTS

A.A.Vorobyov.	
<b>Milestones of HEP Division history</b> .....	3
N.K.Abrossimov, <span style="border: 1px solid black; padding: 0 2px;">S.P.Dmitriev</span> , V.A.Eliseev, G.F.Mikheev, G.A.Riabov, N.N.Chernov.	
<b>History and present status of PNPI synchrocyclotron</b> .....	6

### 1. ELEMENTARY PARTICLE PHYSICS

A.A.Vorobyov, G.A.Korolev, V.A.Schegelsky.	
<b>Diffraction scattering of high energy hadrons</b> .....	21
V.P.Koptev, S.M.Mikirtych'yants, G.V.Shcherbakov.	
<b>Measurement of <math>\pi^+</math> and <math>K^+</math> lifetime and total cross section of the subthreshold <math>K^+</math> meson production</b> .....	32
A.A.Vorobyov, N.K.Terentyev, V.A.Schegelsky.	
<b>Study of rare hyperon decays</b> .....	41
Yu.M.Ivanov, K.E.Kiryanov, A.F.Mezentsev, A.A.Petrinin, <span style="border: 1px solid black; padding: 0 2px;">A.I.Smirnov</span> .	
<b>Study of exotic atoms with crystal diffraction spectrometers</b> .....	52
A.A.Vorobyov, A.G.Krivshich, V.A.Schegelsky.	
<b>Research at CERN large electron-positron collider. L3 experiment</b> .....	65
V.S.Bekrenev, S.P.Kruglov, I.V.Lopatin, V.V.Sumachev.	
<b>Study of pion-nucleon scattering in the region of <math>\pi N</math> resonances</b> .....	77
V.G.Vovchenko, A.A.Zhdanov, V.V.Poliakov, O.Ya.Fedorov, A.V.Shvedchikov.	
<b>Measurement of polarization parameters and analysis of <math>pp</math> elastic scattering at 1 GeV</b> .....	87
V.S.Bekrenev, S.P.Kruglov, I.V.Lopatin.	
<b>Physics with <math>\eta</math> mesons</b> .....	94
V.G.Vovchenko, <span style="border: 1px solid black; padding: 0 2px;">Yu.M.Kazarinov</span> , A.N.Prokofiev.	
<b>Energy dependence of polarization parameters of <math>pp</math> interaction</b> .....	104
A.A.Vorobyov, N.I.Voropaev, E.M.Maev, G.G.Semenchuk.	
<b>Precision measurement of nuclear muon capture by <math>^3\text{He}</math></b> .....	114
V.A.Gordeev.	
<b>Muonium to antimuonium conversion</b> .....	122