

ATOMIC PHYSICS 17

XVII International Conference
ICAP 2000

Florence, Italy 4-9 June 2000

EDITORS

Ennio Arimondo

Università di Pisa, Pisa, Italy

Paolo De Natale

INOA, Florence, Italy

Massimo Inguscio

LENS, Università di Firenze, Florence, Italy

AMERICAN
INSTITUTE
OF PHYSICS

Melville, New York, 2001

AIP CONFERENCE PROCEEDINGS ■ VOLUME 551

CONTENTS

| | |
|---------------|----|
| Preface | ix |
|---------------|----|

CLOCKS

| | |
|--|----|
| Galileo's Clocks | 3 |
| P. Galluzzi | |
| Cold Atom Clocks | 23 |
| C. Salomon, Y. Sortais, S. Bize, M. Abgrall, S. Zhang, | |
| C. Nicolas, C. Mandache, P. Lemonde, P. Laurent, G. Santarelli, | |
| A. Clairon, N. Dimarcq, P. Petit, A. Mann, A. Luiten, and S. Chang | |

FUNDAMENTAL CONSTANTS

| | |
|--|----|
| Progress towards a Measurement of \hbar/M_{Cs} | 43 |
| J. M. Hensley, A. Wicht, B. C. Young, and S. Chu | |
| Optical Frequency Metrology and Its Contribution to the Determination of Fundamental Constants..... | 58 |
| R. Holzwarth, J. Reichert, T. Udem, and T. W. Hänsch | |
| Single Ion Mass Spectrometry and the Fine Structure Constant | 73 |
| D. E. Pritchard, M. P. Bradley, J. V. Porto, S. Rainville, | |
| and J. K. Thompson | |
| Does the Fine Structure Constant vary with Time and Distance? | 86 |
| V. V. Flambaum | |

SINGLE SPECIES

| | |
|---|-----|
| Real-Time Tracking and Trapping of Single Atoms in Cavity QED | 103 |
| H. J. Kimble, K. Birnbaum, A. C. Doherty, C. J. Hood, | |
| T. W. Lynn, H.-C. Nägerl, D. M. Stamper-Kurn, | |
| D. W. Vernooy, and J. Ye | |
| One-Electron Quantum Cyclotron (and Implications for Cold Antihydrogen)..... | 108 |
| G. Gabrielse, S. Peil, B. Odom, and B. D'Urso | |
| Triggered Emission of Single Photons by a Single Molecule | 121 |
| C. Brunel, P. Tamarat, B. Lounis, and M. Orrit | |
| Experiments towards Quantum Information with Trapped Calcium Ions | 130 |
| D. Leibfried, C. Roos, P. Barton, H. Rohde, S. Gulde, | |
| A. B. Mundt, G. Reymond, M. Lederbauer, F. Schmidt-Kaler, | |
| J. Eschner, and R. Blatt | |

ENTANGLEMENT

| | |
|--|------------|
| Step by Step Engineered Entanglement with Atoms and Photons in a Cavity | 143 |
| S. Haroche, G. Nogues, A. Rauschenbeutel, S. Osnaghi, P. Bertet, M. Brune, and J.-M. Raimond | |
| Quantum Computing with Trapped Ions, Atoms, and Light. | 158 |
| A. M. Steane | |
| Scalable Entanglement of Trapped Ions | 173 |
| C. Monroe, C. A. Sackett, D. Kielpinski, B. E. King, C. Langer, V. Meyer, C. J. Myatt, M. Rowe, Q. A. Turchette, W. M. Itano, and D. J. Wineland | |

DARK RESONANCE

| | |
|--|------------|
| Collinear Light Scattering Using Electromagnetically Induced Transparency | 189 |
| S. E. Harris, A. V. Sokolov, D. R. Walker, D. D. Yavuz, and G. Y. Yin | |
| Destruction of Darkness: Optical Coherence Effects and Multi-Wave Mixing in Rubidium Vapor. | 204 |
| A. S. Zibrov, L. Hollberg, V. L. Velichansky, M. O. Scully, M. D. Lukin, H. G. Robinson, A. B. Matsko, A. V. Taichenachev, and V. I. Yudin | |

QED WITH IONS, ATOMS, AND MUONIC SYSTEMS

| | |
|---|------------|
| The Muon Anomalous Magnetic Moment | 221 |
| V. W. Hughes for the muon g-2 Collaboration | |
| Precise Physics of Simple Atoms | 238 |
| S. G. Karshenboim | |
| The Impact of Atomic Precision Measurements in High Energy Physics | 254 |
| R. Casalbuoni | |
| The g-Factor of the Bound Electron in Hydrogenic Ions | 269 |
| W. Quint and the g-Factor Collaboration | |
| Tests of Quantum Electrodynamics in Hydrogenic Ions | 282 |
| J. Silver | |

GRAVITATIONAL WAVES AND DETECTORS

| | |
|---|------------|
| Gravitational Wave Detectors on the Ground and in Space | 293 |
| K. Danzmann | |
| Thermal Noise and Radiation Pressure Effects in Interferometric Measurements | 307 |
| A. Heidmann, P. F. Cohadon, Y. Hadjar, T. Briant, and M. Pinard | |

LASER COOLING AND DEGENERATE MATTER

| | | |
|-----------|---|-----|
| 143 | ^{85}Rb BEC Near a Feshbach Resonance..... | 325 |
| | N. R. Claussen, S. L. Cornish, J. L. Roberts, E. A. Cornell, and C. E. Wieman | |
| 158 | Collective Enhancement and Suppression in Bose-Einstein Condensates | 337 |
| | W. Ketterle, A. P. Chikkatur, and C. Raman | |
| 173 | Laser Cooling: Beyond Optical Molasses and Beyond Closed Transitions | 356 |
| | V. Vuletić, A. J. Kerman, C. Chin, and S. Chu | |
| | Atom Trap Trace Analysis | 367 |
| | Z.-T. Lu, K. Bailey, C.-Y. Chen, X. Du, Y.-M. Li, T. P. O'Connor, and L. Young | |
| | Laser Cooling of Strontium Atoms toward Quantum Degeneracy | 382 |
| | H. Katori, T. Ido, Y. Isoya, and M. Kuwata-Gonokami | |
| 189 | Bouncing Atoms: A Coherent Nano-Probe..... | 397 |
| | N. Westbrook, V. Savalli, V. Josse, L. Cognet, P. Featonby, D. Stevens, C. I. Westbrook, and A. Aspect | |
| | Miniature Guides for Neutral Atoms | 405 |
| | E. A. Hinds | |
| 204 | Exploring a Quantum Degenerate Fermi Gas | 414 |
| | D. S. Jin, B. DeMarco, and S. Papp | |
| | Manipulation and Phase Engineering of Bose-Einstein Condensates | 426 |
| | K. Bongs, S. Burger, K. Sengstock, and W. Ertmer | |
| | Quantized Vortices in a Gaseous Bose-Einstein Condensate | 442 |
| | K. Madison, F. Chevy, W. Wohlleben, and J. Dalibard | |
| 221 | Dynamics of Two Interacting Bose Condensates in a Magnetostatic Trap | 451 |
| 238 | M. Modugno, F. Dalfovo, C. Fort, M. Inguscio, P. Maddaloni, and F. Minardi | |

QUANTUM CONTROL AND COLLISIONAL DYNAMICS

| | | |
|-----------|---|-----|
| 269 | Ultrafast Quantum Control in Atoms and Molecules..... | 463 |
| | P. H. Bucksbaum | |
| 282 | Van der Waals-Induced Level Coupling in Metastable Atom on Surface Collisions | 478 |
| | M. Boustimi, B. Viaris de Lesegno, F. Perales, J. Reinhardt, J. Baudon, J. Robert, and M. Ducloy | |
| 293 | Author Index..... | 489 |

..... 307