

Trapped Ions and Laser Cooling

Selected publications of the Ion Storage Group of the Time and Frequency Division, NBS, Boulder, Colorado

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PREFACE

This collection of papers represents the work on stored atomic ions (initiated in the Fall of 1977) by the Time and Frequency Division of the National Bureau of Standards. Although the primary goal of this research has been the development of techniques necessary for achieving better time and frequency standards, we have also been able to investigate related areas of research.

Papers 15, 20, 21, 24, 25, A5, A8 and A13 were intended to be more general reviews of the subject and include discussion of experiments by other groups. Papers listed with the prefix A are not included here but can be obtained on request. We intend to update this publication periodically to include new work not contained here. We hope this collection of papers will be useful to our colleagues in this and related fields.

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- A3. "The Isolated Electron," Philip Ekstrom and David Wineland, Sci. American 243, no. 2, p. 105-121, August 1980.
- A4. "Shift of $^2S_{1/2}$ Hyperfine Splittings Due to Blackbody Radiation and Its Influence on Frequency Standards," Wayne M. Itano, L. L. Lewis, and D. J. Wineland, J. de Physique, Colloque C8, suppl. to no. 12, vol. 42, Dec. 1981, p. C8-283-287.
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- A7. "High Power Second Harmonic Generation of 257 nm Radiation in an External Ring Cavity," J. C. Bergquist, H. Hemmati, and W. M. Itano, Opt. Commun. 43, 437-442 (1982).
- A8. "High Resolution Spectroscopy of Stored Ions," D. J. Wineland, Wayne M. Itano and R. S. Van Dyck Jr., in Advances in Atomic and Molecular Physics, Vol. 19, ed. by Bederson & Bates, (Academic Press, Aug. 1983), p. 135-186.
- A9. "Laser Cooled $^9\text{Be}^+$ Accurate Clock," J. J. Bollinger, Wayne M. Itano, and D. J. Wineland, Proc. 37th Annual Symp. Freq. Control, 1983, p. 37-41 (copies available from Systematics General Corp., Brinley Plaza, Rt. 38, Wall Township, NJ 07719.)
- A10. "Spectroscopy of Stored Ions Using Fluorescence Techniques," D. J. Wineland, Wayne M. Itano, J. C. Bergquist, and H. Hemmati, S.P.I.E., Vol. 426-Laser Based Ultrasensitive Spectroscopy and Detection V, Society of Photo-Optical Instrumentation Engineers, 1983, p. 65-70.

- A11. "Frequency and Time Standards Based on Stored Ions," J. J. Bollinger, D. J. Wineland, W. M. Itano, J. C. Bergquist and J. D. Prestage, Proc. 16th Ann. Precise Time and Time Interval (PTTI) Applications and Planning Meeting, Naval Research Laboratory, Washington, DC., Dec. 1984, to be published.
- A12. "Measurements of the g_J - Factors of the $6s^2S_{1/2}$ and $6p^2P_{1/2}$ States in $^{198}\text{Hg}^+$," W. M. Itano, J. C. Bergquist, and D. J. Wineland, J. Optical Soc. Am., to be published.
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- A14. "Angular Momentum of Trapped Atomic Particles," D. J. Wineland, J. J. Bollinger, W. M. Itano, and J. D. Prestage, J. Opt. Soc. Am. B, Special issue on "The Mechanical Effects of Light", to be published.