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method of producing bare transition metal clusters in the gas phase. The feasibility of this technique is illustrated by the results of its application to the generation of Co_2 from $\text{Co}_2(\text{CO})_8$. Given the diversity of known potential precursors, this technique is expected to provide specific access to a wide variety of bare transition metal clusters.

KO 6 Excitation of Multi-Level Systems by a Quasimonochromatic Field of Time-Varying Intensity. R. S. BURKEY and C. D. CANTRELL, U. of Texas at Dallas--We calculate the population and dipole-moment expectation value of multi-level, nearly degenerate systems irradiated by a pulsed, quasimonochromatic laser field. The calculations described include an analytic solution in the case of an exponentially varying field amplitude, and a numerical integration in the case of a general time variation; neither technique requires use of the adiabatic-following approximation. Level structures of systems for which plots of populations and polarization versus time, laser frequency, and field strength are presented include one or more nondegenerate levels radiatively coupled to one or more "bands" of nearly degenerate levels.

KO 7 Refractive Index of Nearly Degenerate Multilevel Systems in a Monochromatic Field. G. L. PETERSON, R. S. BURKEY, and C. D. CANTRELL, U. of Texas at Dallas.--We report calculations of the index of refraction (n) and populations of energy levels in several different multilevel systems, under the influence of a monochromatic field in the adiabatic-following approximation. These systems include: (1) a single lower level and several nearly degenerate upper levels with transitions allowed only between the lower and upper levels; (2) two nondegenerate lower levels and several nearly degenerate upper levels with transitions allowed only between the two single levels, and between the higher single level and the several nearly degenerate upper levels; (3) the same system as (2) but with the higher single level replaced by several nearly degenerate levels. Plots of $n-1$ versus frequency and field strength, along with plots of level populations versus field strength, are presented for all systems. Results will be shown for finite and infinite population and coherence decay times.

KO 8 Role of the Anderson Transition in Electronic Energy Transfer in Mixed Organic Crystals, J. KLAFTER, C. M. SOUKOULIS and E. N. ECONOMOU*, Corporate Research Science Laboratories, Exxon Research and Engineering Co., Linden, N.J. 07036 - We have analyzed some recent experimental data on triplet electronic energy transfer (EET) in isotopically mixed naphthalene. These data give the efficiency of EET as a function of an energy sink concentration. We have advanced a possible interpretation of these results in terms of the gradual growth of the participation ratio above the transition concentration \bar{c} . Such a behavior at \bar{c} reflects the same features of the eigenfunctions responsible for the continuous behavior of the mobility at the mobility edges. A coherent potential approximation is used to calculate averaged Green's functions; the $L(E)$ criterion is employed to study the transition in the nature of the eigenstates. The transition is found to take place at a concentration \bar{c} , which is qualitatively in agreement with experiments.

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KO 9 Inner Shell Ionization Cross section for Argon, Krypton and Xenon. Carroll Quarles, Mars Semaan and Lee Estep, Texas Christian U.--As part of experiment to measure atomic-field bremsstrahlung from the electron bombardment of thin rare gas targets in the electron energy range of 1-10 keV, we have measured the K-shell ionization cross section for argon and the L-shell ionization cross section for krypton and xenon in this same electron energy range. Preliminary results will be presented for the absolute cross section obtained by normalizing to the theoretical bremsstrahlung cross section, and will be compared with other experimental work in this energy range as well as with the results of various theoretical calculations for the inner shell ionization cross section.

KO 10 Magnetic Dipole Transition Amplitude M_1 for $6P_{3/2} \rightarrow 7P_{3/2}$ Transition in Atomic Thallium. B.P. DAS and T.P. DAS, SUNY Albany, J. ANDRIESEN, Technische Hogeschool Delft, Netherlands, TAESUL LEE, Computer Science Corporation, Silver Springs, Maryland and S.N. RAY, Systems and Applied Sciences Corporation, Riverdale, Maryland.--Using relativistic many-body theory, we have calculated the magnetic dipole transition amplitude M_1 for the $6P_{3/2} \rightarrow 7P_{3/2}$ transition in atomic thallium, which is important for the understanding of the theory of the circular dichroism effects in thallium atom due to the presence of the parity-violating neutral weak current interaction. Our net result for M_1 is $-2.43 \times 10^{-5} \mu_B$ which is in satisfactory agreement with the experimental value¹ of $(-2.11 \pm 0.30) \times 10^{-5} \mu_B$. The net theoretical result is composed of -1.500 , 0.032 and $-0.957 \times 10^{-5} \mu_B$ from direct, consistency and correlation effects. Physical reasons for the relative importance of these effects will be discussed.
¹S. Chu, E.D. Commins and R. Conti Phys. Lett. **60A**, 96 (1977)

KO 11 Theory of Hyperfine Interactions in Alkaline Earth Ions - $^{25}\text{Mg}^+$. S. AHMAD AND T.P. DAS, SUNY Albany and J. ANDRIESEN, Technische Hogeschool Delft, Netherlands*. Relativistic many-body perturbation theory¹ has been used to investigate the hyperfine structure of singly ionized magnesium ion, to explain the recent experimental data² on Mg^+ as well as to compare the results in alkali atoms with those in the corresponding isoelectronic alkaline-earth positive ion series. The one-electron contribution to the hyperfine constant in $^{25}\text{Mg}^+$ was found to be -553 MHz, composed of direct and exchange core polarization contributions of -466 MHz and -87 MHz respectively, the many-electron contribution being -48 MHz. The net theoretical hyperfine constant comes out as $-(602 \pm 8)$ MHz, in good agreement with the experimental value² of -596.25 MHz.
*Supported by NIH grant GM25230
¹M. Vajed-Samii, et.al. Phys. Rev. A **20**, 1787 (1979).
²W.M. Itano and D.J. Wineland, Phys. Rev. A **24**, 1364 (1981).

Supplemental Program

KO 12 Relativistic Theory of Hyperfine Interactions in Excited $^2S_{1/2}$ States of $^{137}\text{Ba}^+$ Ion*. S. AHMAD, T.P. DAS, SUNY Albany and J. ANDRIESEN, Technische Hogeschool Delft, Netherlands.--Using relativistic many-body perturbation theory, we have investigated the mechanisms contributing to the hyperfine interaction in excited $^2S_{1/2}$ states ($7s$ through $11s$) of $^{137}\text{Ba}^+$ ion. In addition to showing a rapid decrease in the net hyperfine constants in going to higher states, the results show interesting features for the ratio of the exchange core polarization and correlation contributions to the direct contribution, some of them being distinct from the trends in neutral alkali atoms¹. The ECP