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New Prospects for Atomic Parity Violation BENJAMIN ROBERTS, VLADIMIR DZUBA, VICTOR FLAMBAUM, Univ of New South Wales — We have performed calculations of parity violating effects for several heavy elements in which the effect is greatly enhanced due to the presence of very closely spaced atomic and nuclear states of opposite parity. Also, recently, an optical cavity that can enhance parity violating signals by around 4 orders of magnitude has been developed. If combined with the further parity violation enhancement found in diatomic molecules, this signal enhancement can be significantly increased. So far, a successful measurement of parity violation in molecules has not been achieved. Theoretical considerations are crucial for success in this field. Accurate calculations are required in order to interpret the measurements in terms of fundamental physics parameters, and also to identify suitable systems for study. We perform calculations of parity violation (optical rotation) for molecules suitable for the "optical cavity enhanced"-type measurements discussed above. With these calculations we identify candidates especially suitable for the measurements in order to maximise the parity-violating effect without detrimentally affecting the sensitivity and systematics.

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