

# Joint CQSE and CASTS Seminar

Weekly Seminar  
Jun. 14, 2013 (Friday)

TIME Jun. 14, 14:30 ~ 15:30  
TITLE Theoretical Studies of the Relativistic and Confinement Effects on the Photoionization of endohedral atoms Be@C<sub>60</sub> and Mg@C<sub>60</sub>  
SPEAKER Prof. Hsin-Chang Chi  
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## Abstract

Recently, much attention has been paid to the photoionization processes of confined atomic systems. We have applied the multiconfiguration relativistic random-phase approximation theory (MCRRPA) to investigate the effects of relativity and confinement on the photoionization processes of the valence subshells endohedral atoms Be@C<sub>60</sub> and Mg@C<sub>60</sub>. The interaction of the fullerene C<sub>60</sub> electron shell on the caged atom Be or Mg is modeled by an attractive potential well with spherical symmetry and finite depth. Photoionization cross sections, angular asymmetry parameters and spin polarizations of the photoelectrons are calculated. Confinement resonances due to the influence of the C<sub>60</sub> electron shell are obtained. The significance of adopting a multiconfiguration description for the caged Be or Mg is demonstrated by comparison with the single-configuration relativistic random-phase approximation (RRPA) calculation. The threshold cross section and the position of the Cooper minimum in the  $ns_{1/2}$  ( $n=2$  for Be@C<sub>60</sub> and  $n=3$  Mg@C<sub>60</sub>, respectively) for photoionization cross sections predicted by our calculations are in notable discrepancies with the RRPA calculations. Confinement enhanced relativistic effects are found in the photoelectron angular distribution and spin polarizations for both endohedral atoms.

