Entanglement of two strongly correlated electrons in a lateral quantum dot\cite{1} CONSTANTINE YANNOULEAS, UZI LANDMAN, Georgia Institute of Technology — Exact-diagonalization calculations for two electrons in an elliptic lateral quantum dot show that the electrons can localize and form a molecular dimer even for screened interelectron repulsion. The calculated singlet-triplet splitting ($J$) as a function of the magnetic field ($B$) agrees with cotunneling measurements;\cite{2} its behavior reflects the effective dissociation\cite{3} of the electron dimer for large $B$. Knowledge of the dot shape and of $J(B)$ allows determination of two measures of entanglement (concurrence and von Neumann entropy for indistinguishable fermions), whose behavior correlates also with the dissociation of the dimer. The theoretical value for the concurrence at $B = 0$ agrees with the experimental estimates.

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\cite{3}C. Yannouleas and U. Landman, Int. J. Quantum Chem. 90, 699 (2002)