

GATE ELECTRIC FIELD CONTROL
OVER THE TUNNEL CONDUCTIVITY
OF A MOLECULE

Ye.V. Shevchenko, E.G. Petrov

Bogolyubov Institute for Theoretical Physics,
Nat. Acad. of Sci. of Ukraine
(14b, Metrolohichna Str., Kyiv 03680, Ukraine;
e-mail: shevchenko@bitp.kiev.ua)

S u m m a r y

The role of a gate potential on the formation of a tunnel current in the system “electrode–molecule–electrode” has been studied in the configuration where the interior part of the molecule is a linear bridge with strongly delocalized molecular orbitals, the energies of which are assumed to be well separated from both the Fermi levels of electrodes and the electron levels of molecular end groups. It has been shown that the electric potential of the gate electrode governs the molecular conductivity by shifting the electron levels of the bridge. Hence, the current-voltage characteristics of such a molecular device can be controlled in a wide range of bias voltages.