

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Wave packet dynamics for atomic projectile in solid film GEN-
NADIY FILIPPOV, Cheboksary Polytechnic Institute (branch) of the Moscow State
Open University — The physics of phenomena extended during the passage of a
swift atomic projectile through solid has a long history. A considerable amount of
works was performed and a wide class of the so-called orientation phenomena was
revealed. The theory of such phenomena usually based on assumption on a strength
spatial localization of massive accelerated particles (nucleons, nuclei) having a suf-
ficiently great velocity in a solid. The other point of view was proposed by Kagan
& Kononetz, when it was stated a particle moving in a crystal should be described
with the help of one Bloch wave and obviously should be delocalized. It was shown
the channeling phenomena could be well described also with this theory. The width
of a particle's wave packet is important in some physical effects, e.g., in diffraction.
With the help of density matrix calculation we show a presence of a spatial localiza-
tion for a projectile. We estimate the time behavior of a packet width and show the
specific effects of memory and stabilization, which follow from a wave nature of a
micro-world. We show also the sophistic nature of a free wave packet notion which
can not be realized in reality.

Gennadiy Filippov
Cheboksary Polytechnic Institute (branch) of the
Moscow State Open University

Date submitted: 17 Jan 2012

Electronic form version 1.4