Unravelling the role of quantum interference in the weak-field laser phase modulation control of photofragment distributions - DTU Orbit (08/11/2017)

Unravelling the role of quantum interference in the weak-field laser phase modulation control of photofragment distributions

The role played by quantum interference in the laser phase modulation coherent control of photofragment distributions in the weak-field regime is investigated in detail in this work. The specific application involves realistic wave packet calculations of the transient vibrational populations of the $Br_2(B,v_f)$ fragment produced upon predissociation of the Ne-Br_2(B) complex, which is excited to a superposition of overlapping resonance states using different fixed bandwidth pulses where the linear chirps are varied. The postpulse transient phase modulation effects observed on fragment populations for a long time window are explained in terms of the mechanism of interference between overlapping resonances. A detailed description of how the interference mechanism affects the magnitude and the time window of the phase control effects is also provided. In the light of the results, the conditions to maximize phase modulation control on fragment distributions are discussed.

General information

State: Published
Organisations: Department of Chemistry, Consejo Superior de Investigaciones Cientificas
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Number of pages: 8
Pages: 4772-4779
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information

Journal: Physical Chemistry Chemical Physics
Volume: 18
Issue number: 6
ISSN (Print): 1463-9076
Ratings:
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.06 SJR 1.678 SNIP 1.117
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.771 SNIP 1.244 CiteScore 4.45
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.772 SNIP 1.253 CiteScore 4.29
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.715 SNIP 1.216 CiteScore 4.05
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.916 SNIP 1.184 CiteScore 3.67
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.697 SNIP 1.203 CiteScore 3.6
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.802 SNIP 1.196
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.127 SNIP 1.369
Web of Science (2009): Indexed yes

BFI (2008): BFI-level 2
Scopus rating (2008): SJR 2.158 SNIP 1.211
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.84 SNIP 1.138
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.467 SNIP 1.128
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.389 SNIP 1.104
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.173 SNIP 1.007
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.093 SNIP 0.925
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.122 SNIP 0.973
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.09 SNIP 0.914
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.948 SNIP 1.068
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.121 SNIP 0
Original language: English
DOIs:
10.1039/c5cp06094j
Source: FindIt
Source-ID: 2290434628
Publication: Research - peer-review › Journal article – Annual report year: 2016