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Spin-torch experiment on reaction centers of *Rhodobacter sphaeroides*

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of *Rhodobacter sphaeroides*

Karthick Babu Sai Sankar Gupta

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Spin-torch experiments on reaction centers of *Rhodobacter sphaeroides*

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To Nature

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List of abbreviations

1D	one-dimensional
2D	two-dimensional
A	absorptive
ADF	Amsterdam density functional
ADP	adenosine-di-phosphate
AFM	atomic force microscopy
ALA	δ -aminolevulinic acid
ATP	adenosine-tri-phosphate
B _A	accessory BChl on the "active" branch A
B _B	accessory BChl on the "inactive" branch B
BChl <i>a</i>	bacteriochlorophyll <i>a</i>
BPhe <i>a</i> , Φ	bacteriopheophytin <i>a</i>
BR-24	Burum and Rhim pulse sequence
C7	seven phase-shifted radiofrequency pulse cycle
Car	carotenoid
CI	continuous illumination
Corr	corrected
CP	cross-polarization
CS	chemical shift
CSA	chemical shift anisotropy
CW	continuous wave decoupling
CYCLOPS	cyclically ordered phase sequence
DARR	dipolar-assisted rotational resonance
DD	differential decay
Dec	decoupling
DFT	density functional theory
DRAMA	dipolar recovery at the magic angle
DUMBO	a numerically optimized sequence
E	emissive
EDTA	ethylene-diamine-tetra-acetic acid
ENDOR	electron nuclear double resonance
EPR	electron paramagnetic resonance
eq	equation
ET	electron transfer reactions
FSLG	frequency-switched Lee-Goldburg
FWHH	full width at half height
HH	Hartmann-Hahn condition
His	histidine
HOMO	highest occupied molecular orbital
LDAO	lauryldimethylamine-oxide (N,N-dimethyldodecylamine-N-oxide)
LG	Lee-Goldburg
LG-CP	Lee-Goldburg cross-polarization

LH	light harvesting antenna complexes
MAS	magic angle spinning
mix	mixing time
MREV-8	Mansfield-Rhim-Elleman-Vaughn sequence
NMR	nuclear magnetic resonance
NSD	normal coordinate structural decomposition
P	Special Pair in ground state (primary donor)
P*	Special Pair in excited state
PCET	proton coupled electron transfer
PDB	protein data bank
PDSD	proton driven spin diffusion
Photo-CIDNP	photochemically induced dynamic nuclear polarization
P _L	part of the Special Pair on the “active” branch A (L polypeptide)
P _M	part of the Special Pair on the “inactive” branch B (M polypeptide)
PMLG	phase-modulated Lee-Goldburg
ppm	parts per million
PSU	photosynthetic unit
Q _A	ubiquinones-10 on the “active” branch A
Q _B	ubiquinones-10 on the “inactive” branch B
<i>R. sphaeroides</i>	<i>Rhodobacter sphaeroides</i>
R3	rotary resonance recoupling
RC	reaction center
REDOR	rotational echo double resonance
rf	radio-frequency
RFDR	radio-frequency driven dipolar recoupling
RPM	radical pair mechanism
S	singlet state
SPINAL	small phase incremental alternation
SW _f -TPPM	Swept-frequency two-pulse phase modulation
T ₀	triplet state with magnetic quantum number 0
TEDOR	transferred-echo double resonance
TPPM	two-pulse phase modulated decoupling
TSM	electron-electron-nuclear three spin mixing
WAHUHA	Waugh-Huber-Haberlen Sequence
wPMLG	windowed phase-modulated Lee-Goldburg
WT	wild-type
XiX	X inverse-X decoupling
Φ _A	bacteriopheophytin <i>a</i> on the “active” branch A
Φ _B	bacteriopheophytin <i>a</i> on the “inactive” branch B