

Supporting information

Direct time-frequency response of electronic coherences in assemblies of colloidal CdSe quantum dot dimers probed at room temperature by 2-dimensional electronic spectroscopy

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Tables S1, S2 and S3

Table S1: Calculated FS state transition energies, inhomogeneous broadenings and dephasing times, and dipole moments for the ground state to the $1S_{3/2}^L$ and $1S_{3/2}^H$ bands of FS states averaged over an ensemble of 4000 3nm/9% dimers.

i	Band	j	Transition Energy (cm ⁻¹)	Inhomogeneous Broadening (cm ⁻¹)	Inhomogeneous Dephasing Time (fs)	Transition dipole Moment (a.u.)
0	$1S_{3/2}^L$	1	17631	436	76.5	7.63
0		2	17631	436	76.5	7.53
0		3	17793	439	76.0	7.72
0		4	18476	487	68.1	11.00
0		5	18476	487	68.1	11.00
0		6	18595	490	67.8	9.59
0		7	18644	510	65.2	1.42
0		8	18669	507	65.6	2.51
0	$1S_{3/2}^H$	9	18863	527	62.1	6.19
0		10	18868	527	62.2	6.12
0		11	18949	534	61.0	8.01
0		12	19677	567	57.9	1.33
0		13	19686	575	57.0	1.11
0		14	19763	563	58.3	2.13
0		15	19795	586	55.8	1.19
0		16	19834	606	53.7	0.78

Table S2: Calculated transition energies (approximate) between dimer FS states with the corresponding coherence periods, inhomogeneous dephasing times and emission dipole strengths for the 5 types of coherences discussed in the result section.

Band	i	Band	j	Transition Energy (cm ⁻¹)	Period (fs)	Inhomogeneous Dephasing Time (fs)	Dipole Strength (a.u.)
$1S_{3/2}^L$	4	$1S_{3/2}^L$	6	120	281	752	105.5
	5			120	281	752	105.5
$1S_{3/2}^L$	3	$1S_{3/2}^L$	4	680	49	124	84.9
			5	680	49	124	84.9
	1		4	850	39	263	84.0
			5	850	39	263	81.9
	2		4	850	39	263	83.3
			5	850	39	263	81.2
	1		6	960	35	342	73.1
	2			960	35	342	73.1
$1S_{3/2}^L$	4	$1S_{3/2}^H$	11	480	68	110	88.6
	5			480	68	110	86.4

Table S3: Transition energies between ground, mono- and biexciton states in the system. Also given are the corresponding periods, inhomogeneous dephasing times and dipole strengths.

i	j	Transition Energy (cm ⁻¹)	Period (fs)	Inhomogeneous Dephasing Time (fs)	Transition Dipole Moment (a.u.)
0	1	18550	1.80	89	14.4
0	2	22180	1.50	42	10.2
0	3	37908	0.88	45	0.0
0	4	39521	0.84	29	0.0
0	5	41134	0.81	21	0.0
1	3	19357	1.72	89	14.4
1	4	20970	1.59	42	12.0
1	5	22583	1.48	27	0.0
2	3	15727	2.12	71	0.0
2	4	17340	1.92	89	12.2
2	5	18954	1.76	42	10.2