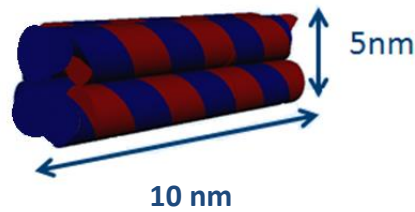


## Annexes

### A.1. Naked DNA nanostructures dimensions (without the extension)



**Figure A.1.** Schematics of the 8S nanostructure showing its dimensions as designed. The hydrodynamic diameter of this structure was determined by dynamic light scattering technique in  $9.5 \text{ nm} \pm 2.3 \text{ nm}$  as described in reference 16.

### A.2. DNA strands sequences of the DNA nanoswitches and the DNA naked structures

**Sequences for Nanoswitch 3.** Constituted by 2 strands: the short one contains the Fluorophore (Cy5), and the large one with the extension (in green) and the Quencher (BHQ\_2).

- Short strand: AAGAAGAAAAAGGGAAGGGA/Cy5/
- Large strand:  
**CGCCATTCA**TCCTTCCCTTTTCTTCTTTGTTCTTCTTTCCCTTCCCT/BHQ\_2/

**Sequences for Nanoswitch 1.** Constituted by 2 strands: the short one contains the Fluorophore (Cy5), and the large one with the extension (in green) and the Quencher (BHQ\_2)

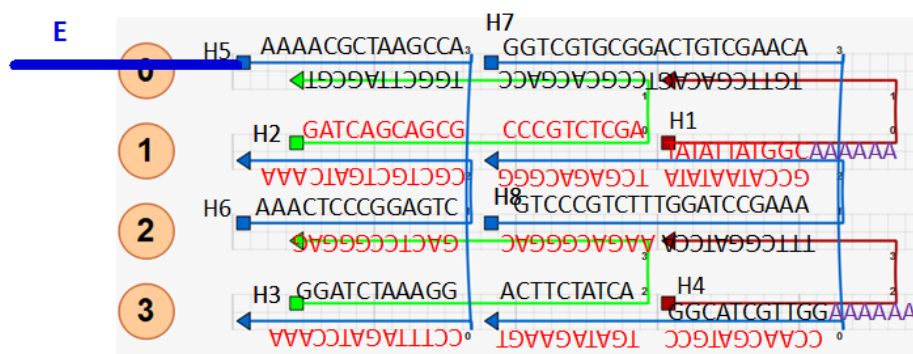
- Short strand: AAGAAGAAGAAAGGGA/Cy5/
- Large strand:  
**CGCCATTCA**TCCTTCTTCTTCTTCTTTGTTCTTCTTCCCT/BHQ\_2/

**Sequences and sketches for the naked structures.** Constituted by 8 strands:

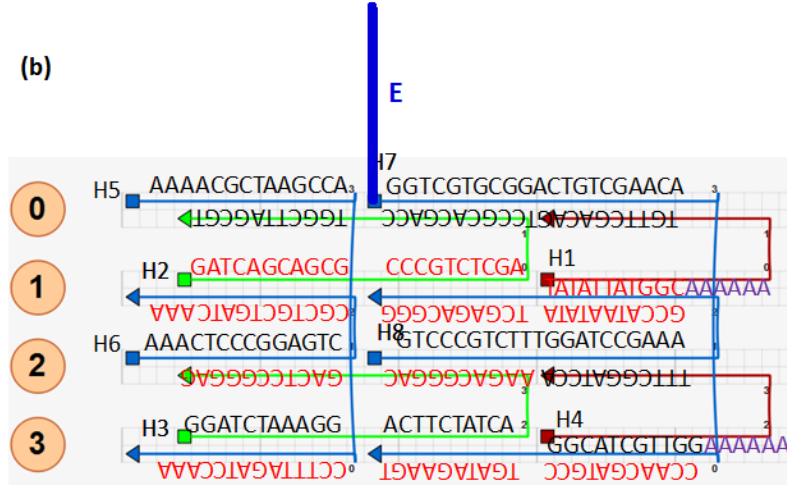
- Strand 1: TATATTATGGCAAAAAATGTTGACAGT
- Strand 2: GATCAGCAGCGCCCGTCTCGACCGCACGACCTGGCTTAGCGT
- Strand 3: GGATCTAAAGGACTTCTATCAAAGACGGGACGACTCCGGGAG
- Strand 4: GGCATCGTTGGAAAAAATTCGGATCCA
- Strand 5: AAAACGCTAAGCCACCTTTAGATCCAAA
- Strand 6: AAACCTCCGGAGTCCGCTGCTGATCAAAA
- Strand 7: GGTCGTGCGGACTGTGCAACACCAACGATGCCTGATAGAAGT

- Strand 8: GTCCCGTCTTTGGATCCGAAAGCCATAATATATCGAGACGGG
- Strand 5 extended (the blue region is complementary to the extension of the nanoswitches):  
**TGAATGAATGGCG**AAAACGCTAAGCCACCTTTAGATCCAAA
- Strand 7 extended (the blue region is complementary to the extension of the nanoswitches):  
**TGAATGAATGGCG**GGTCGTGCGGACTGTCGAACACCAACGATGCCTGATAGAAGT

(a)



(b)



**Figure A.2.** (a) Sketches of the naked DNA structure 8S, where the strand 5 is replaced by the strand 5 extended (the extension marked in blue) with the assignment of the sequences. (b) Sketch of the naked DNA structure 8S', where the strand 7 is replaced by the strand 7 extended (the extension marked in blue) with the assignment of the sequences.

### A.3. Melting temperatures ( $T_m$ ) for all the DNA complexes at the pHs investigated

8SN1	$T_m$ (°C)	$\sigma$	8S'N1	$T_m$ (°C)	$\sigma$
pH 6,3	48,1	10,9	pH 6,7	46,1	9,8
pH 6,8	43,2	18,0	pH 7	44,6	9,9
pH 7,1	46,1	7,5	pH 7,5	44,6	7,9
pH 7,5	44,6	7,6	pH 7,8	44,3	7,6
pH 8	44,6	9,0	pH 8,4	43,1	11,0
8SN3	$T_m$ (°C)	$\sigma$	8S'N3	$T_m$ (°C)	$\sigma$
pH 6,5	47,7	8,5	pH 7	45,5	8,7
pH 6,9	46,3	8,6	pH 7,5	45,6	8,8
pH 7,5	46,1	11,1	pH 8	46,1	9,6
pH 7,8	48,0	11,8	pH 8,3	46,2	10,7
pH 8	48,1	11,4	pH 8,7	45,9	10,3
pH 8,5	47,6	10,2			

**A.4. Quenching efficiency (%)** of the DNA structures and the pHs (basic and acidic) at which samples were measured. \*Note that measurements of N3 could not be carried out due to technical issues.

DNA structures	Basic pH	Acidic pH	Quenching efficiency (%)
N1	9	6,5	99
8SN1	8,2	6,9	89
8S'N1	8,3	7	91
N3	*	*	*
8SN3	8,2	6,7	99
8S'N3	8,4	7	98