*Izabela Kaminska‡, Carolin Vietz‡, Álvaro Cuartero-González, Philip Tinnefeld, Antonio I. Fernández-Domínguez and Guillermo P. Acuna**

Strong Plasmonic Enhancement of Single Molecule Photostability in Silver Dimer Optical Antenna

Affiliations:

***Corresponding author: Guillermo P. Acuna**, Institute for Physical & Theoretical Chemistry, and Braunschweig Integrated Centre of Systems Biology (BRICS), and Laboratory for Emerging Nanometrology (LENA), Braunschweig University of Technology, Rebenring 56, 38106 Braunschweig, Germany, e-mail: g.acuna@tu-bs.de

Izabela Kaminska, Carolin Vietz and Philip Tinnefeld: Institute for Physical & Theoretical Chemistry, and Braunschweig Integrated Centre of Systems Biology (BRICS), and Laboratory for Emerging Nanometrology (LENA), Braunschweig University of Technology, Rebenring 56, 38106 Braunschweig, Germany

Izabela Kaminska: Institute of Physics, Faculty of Physics, Astronomy, and Informatics, Nicolaus Copernicus University, Grudziadzka 5, 87-100 Torun, Poland

Philip Tinnefeld: Department Chemie, Ludwig-Maximilians-Universitaet Muenchen, Butenandtstr. 5-13 Haus E, 81377 Muenchen, Germany

Álvaro Cuartero-González and Antonio I. Fernández-Domínguez: Departamento de Física Teórica de la Materia Condensada and Condensed Matter Physics Center (IFIMAC), Universidad Autónoma de Madrid, E-28049, Spain

Supplementary Information

Design of DNA origami structures

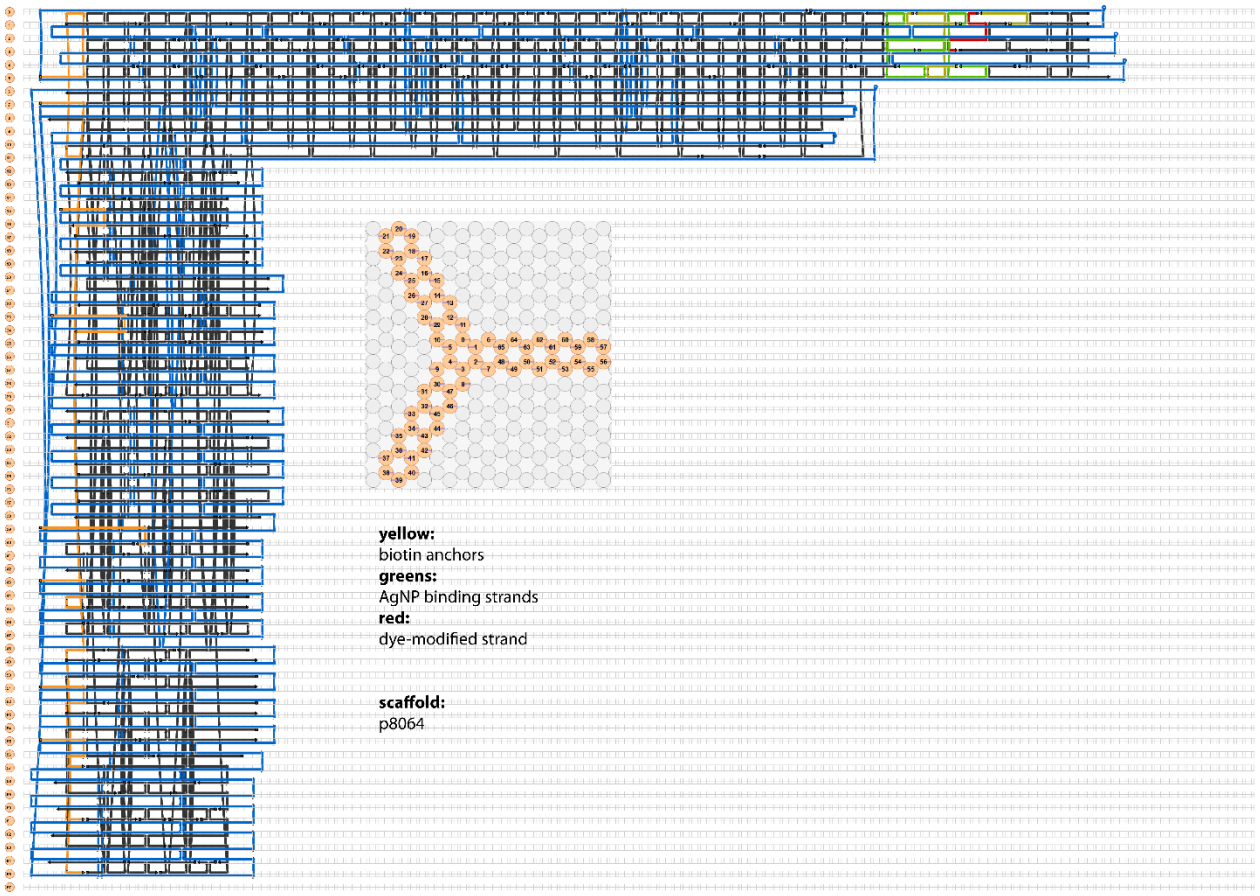

Figure S1. Cadnano design of the DNA origami pillar. Zoom in to see details.

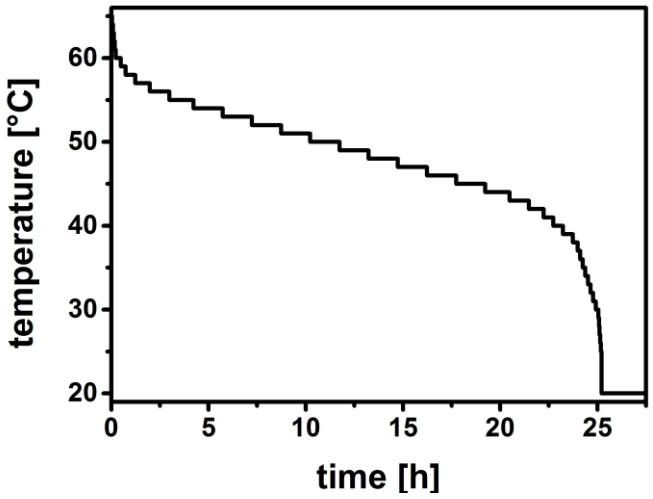

Figure S2. Folding program for the DNA origami pillar

DNA sequences

Table S1. Unmodified staples from the 5’ to the 3’ end for the DNA origami pillar.

Sequence (5’ to 3’)	Length
TTAGTTTGAGTGCCCGAGAAATAAAGAAATTGCGTAGAGATA	42
TATGACTTTATACATTTTTTTTTAATGGAAACAGTACACCGT	42
AATAAAACGAACTATGACCCCACCAAGC	28
CTCATCGGGATTGAGTGAGCGAGTAACAACCCGTC	35
CCCAGCTACAATGACAGCATTTGAGGCAAGTTGAGAAATGAA	42
TCATACATTTAATACCGATAGCCCTAAAACATCGAACGTAAC	42
ACGCGGTCCGTTTTTGGGTAAGTGA	25
CTTACGGAACAGTCAGGACGTTGGGAAGAAA	31
GGAACCATACAGGCAAGGCAAATCAAAAAGACGTAGTAGCAT	42
CTAAATCGGTCAGAATTAGCAAAATTAAGCAATAAAATAATA	42
TTTAGCGATACCAACGCGTTA	21
AAGAAAGCTTGATACCGCCACGCATACAGACCAGGCGCTGAC	42
CCCCGCTAGGGCAACAGCTGGCGAAAGGGGGATGTGCTTATT	42
GCCCGAGTACGAGCCGGAAGC	21
CATTTCGCAAATGTCATCTGCGAACGAGAGATTCACAATGCC	42
TATTTAAATTGCAGGAAGATTG	22
AAAGATTACAGAACGGGAGAAGGAAACGTCACCAATGAAACCA	43
ACGTAAGAATTCGTTCTTAGAAGAACTCAAACTATCGGATAA	42
GCGAATCAGTGAGGCCACCGAGTAGTAGCAACTGAGAGTTGA	42
TCGTGCCGGAGTCAATAGTGAATTTGCAGAT	31
TAGCCTCAGAGCATACCCTGT	21
AGCAACAAAGTCAGAAATAATATCCAATAATCGGCTCAGGGA	42
AGGCTTGCGAGACTCCTCAAGAGAAAAGTATTCGGAAC	38
ACCTGACGGGGAAAGCCGGCGAACCAAGTGTCTGCGCGTTGC	42
CCGTAATCAGTAGCGACAGAATCTAATTATTCATTAAAAAGG	42
GAACTGGCTCATTACAACTTTAATCATTCTTGAGATTACTTA	42
GAGTTAAAAGGGTAATTGAGCGCTAATATCAGAGGAACTGAACACC	46
AGTTTCCAACATTATTACATTATAC	25
ACGCGAGAGAAGGCCATGTAATTTAGGCCAGGCTTAATTGAGAATCGC	48
ACTAATGCCACTACGAATAAA	21
CTGTATGGGATTACCGTTAGTATCA	25
TAGCCAGCTTTCATCCAAAAATAAACGT	28
CCTCGTTTACCAGAAACCAAA	21
TTAGCCCTGACGAGAAACACCAGAAATTGGGGTGAATTATTTTAA	45
TGAGTAAAGGATAAGTTTAGCTATATCATAGACCATTAGATA	42
ATTTCCTGATTATCAGATGATGGCTTTAAAAAGACGCTAAAA	42

CCAGCCTCCGATCCTCATGCCGGA	24
ATGAAGGGTAAAGTTCACGGTGCGGCCATGCCGGTCGCCATG	42
TAAGTTGGCATGATTAAAGAA	21
TAATATCAAAGGCACCGCTTCTGGCACT	28
GTCGCAGAAAAACTTAAATTTGCC	24
GTTAAAGGAAAGACAGCATCTGCCTATTTAAGAGGCAGGAGGTTTA	46
AAGGCTCCAAAAGGAGCCTTTATATTTTTTCACGTGCTACAGTCACCCT	49
TAACGACATTTTTACCAGCGCCAAAGAAAGTTACCAGAACCCAAA	45
AAGGGATATTCATTACCGTAATCTATAGGCT	31
TTCGGTCCCATCGCATAGTTGCGCCGACATGCTTTCGAGGTG	42
AATATCGTTAAGAGAGCAAAGCGGATTGTGAAAAATCAGGTCTTT	45
AAATGACGCTAAATGGATTATTTACATTGGCGAATACCTGGA	42
ACCGCCACCCTCAGAACCCGTACTCTAGGGA	31
TTCGGGGTTTCTGCCAGGCCTGTGACGATCC	31
AGTACCGCATTCCACAACATGTTCAGCCTTAAGGTAAAGTAATTC	45
CCCGGTTGATAAAGCATGTCAATC	24
AGTAGGTATATGCGTTATACA	21
CTGGCATTAGGAGAATAAAATGAAGAAACGATTTTTTGAGTA	42
CGAACACCAAATAAAATAGCAGCCAAGTTTGCCTTTAGCGTCAGA	45
TGCTAAATCGGGGAGCCCCCGATTTAGAGCTAGCAGAACATT	42
CGCGCTACAGAGTAATAAAAGGGACATTCTGATAGAACTTAG	42
AAGACAAATCAGCTGCTCATTCAGTCTGACCA	32
TTTTCCAGCATCAGCGGGGCTAAAGAACCTCGTAGCACGCCA	42
ACATAAGTAGAAAAATCAAGAAGCAAAAGAAGATGTCAT	39
CAAAATCACCGGAACCAGAGCCAGATTTTGTCACAATCACAC	42
GCTGTAGTTAGAGCTTAATTG	21
TTATAAGGGTATGGAATAATTCATCAATATA	31
ATAGCGAGAGGCTATCATAACCAAATCCCAAAGAAAATTTCATCCTCAT	49
GCGAAACAAAGTGTAAAACACATGGCCTCGATTGAACCA	39
TTTAGATTCACCAGTCACACGACCGGCGCGTGCTTTCCCAGA	42
CAAGCCCAATAGGAACCACCCTCACCCGGAA	31
AGCTCTTACCGAAGCCCAATA	21
CATTTGAGATAACCCACGAAACAATG	26
AATACCCCAACATTCATCAAAAATAATTCGCGTCT	35
ACGAGCGGCGCGGTCAGGCAAGGCGATTAAGTTGGGTAAAAC	42
TAAAACCGTTAAAGAGTCTGTCCATCCAGAAACCACACAATC	42
TATTACGAATAATAAACAAATCAGATATGCGT	32
GAAGGAGCGGAATTATCATCATATATCATTTACATAGCACAA	42
CCTCGTCTTTCCACCACCGGAACCGCCTCCCTCA	34
AACAAGAGCCTAATGCAGAACGCGC	25
AGAAATCGTTAGACTACCTTTTTAAGGCGTTCTGACCTTTTTGCA	45
AGTTTATTGTCCATATAACAGTTGATTC	28

ATTTGGAAGTTTCATGCCTCAACATGTTTTA	31
GAGAACAATATACAAAATCGCGCAGAGGCGATTCGACAAATCCTTTAAC	49
GTCGCGTGCCTTCGAATTGTCAAAG	25
GAACCGCCACCCTCCATATCATACC	25
CGCGCCGCCACCAGAACAGAGCCATAAAGGTGGAA	35
CAAAGCACTAGATAGCTCCATTCAGGCTGCGCAACTGTCTTG	42
GAGGCCAAGCTTTGAATACCAAGTACGGATTACCTTTTCAAA	42
GGCGAAGCACCGTAATAACGCCAGGGTTTTCCCAGTCATGGG	42
TGAAAATCCGGTCAATAACCTAAATTTTAGCCTTT	35
TATTGAAAGGAATTGAGGTAG	21
GAGCATTTATCCTGAATCAAACGTGACTCCT	31
ATCGGTCAGATGATATTCACAAACCAAAAGA	31
GTAAAACGACGGCCCATCACCCAAATCAGCGC	32
GGCGCAGACGGTCAATCATCGAGACCTGCTCCATGTGGT	39
TTTTTGCGGATGCTCCTAAAATGTTTAGATGAATTTTGCAAAAGAAGTT	49
AAGGCCTGTTTAGTATCATGTTAGCTACCTC	31
CGAGGGTACTTTTTCATGAACGGGGTCATAATGCCGAGCCACCACC	46
AGCTTTCAGAGGTGGCGATGGCCAGCGGGAAT	32
TTGGTAGAACATTTAATTAAGCAAC	25
ACCAGACCGGATTAATTCGAGC	22
GGCAACACCAGGGTCTAATGAGTGAGCTCACAACAATAGGGT	42
ATCGATGCTGAGAGTCTACAAGGAGAGGGAACGCCAAAAGGA	42
ACCAACAAACCAAAATTAACAATTTCATTTGAATTACCGAGG	42
GCGAAAATCCCGTAAAAAAAGCCGTGGTGCTCATACCGGCGTCCG	45
GAATTCGTCTCGTCGCTGGGTCTGCAATCCATTGCAACACGG	42
AATATGCAACTACCATCATAGACCGGAACCGC	32
CCTGCGCTGGGTGGCGAGAAAGGAAGGGAAGGAGCGGGGCCG	42
CAAATTATTCATTTCAATTACCTGAGTA	28
AATTGTGTCGAAATCCGCGGCACACAACGGAGATTTGTATCA	42
TGCGTGTTCAGGTTGTGTACATCG	24
AACCGTGTCATTGCAACGGTAATATATTTTAAATGAAAGGGT	42
TGGCTTTTTACCGTAGAATGGAAAGCG	27
CGTACAGGCCCCCTAACCGTCCCCGGGTACCGAGCGTTC	39
AAGAAAGCGCTGAACCTCAAATATTCTAAAGGAAAGCGTTCA	42
TTCATCGGCATTTTCGGTCATATCAAAA	28
CCTAATTTAACAAACCCTCAATCAATATCTGATTCGCTAATC	42
AAACTCACAGGAACGGTACGCCAGTAAAGGGGGTGAGGAACC	42
AATTTCTTAAACCCGCTTAATTGTATCGTTGCGGGCGATATA	42
GAGAAGGCATCTGCAATGGGATAGGTCAAAAC	32
CCAATGTTTAAGTACGGTGTCCAAC	25
AAATCAGCTCATTTTTTAACCATTTTGTTAAAATTCGCATTA	42
TTTACCAGTCCCGGCCTGCAGCCCACTACGGGCGCACCAGCT	42

CTGAATATAGAACCAAATTATTTGCACGTAAAACAACGT	39
GTAATTAATTTAGAATCTGGGAAGGGCGATCGGTGCGGCAAA	42
TAAAGCCTCCAGTACCTCATAGTTAGCG	28
AGGGAGCCGCCACGGGAACGGATAGGCGAAAGCATCAGCACTCTG	45
TGAGTGTTCCGAAAGCCCTTCACCGCCTAGGCGGTATTA	39
TTGGGCGGCTGATTTCGGCAAAATCCCT	28
CCGACTTGTTGCTAAAATTTATTTAGTTCGCGAGAGTCGTCTTTCCAGA	49
CCATAATGCCAGGCTATCAAGGCCGGAGACATCTA	35
TGACCGCGCCTTAATTTACAATATTTTTGAATGGCTATCACA	42
ACTAAAGAGCAACGTGAAAATCTCCACCCACAACTAAAGGAA	42
TTTCCATGGCACCAACCTACGTCATACA	28
TTGCGAATAATATTTACAGCGGAGTGAGGTAAAATTTTGAGG	42
ATAAAGTCTTTCCTTATCACT	21
AGGACAGATGAACGGTGTAACATAAGGGAACCGAAGAAT	39
CAAGCCGCCCAATAGCAAGTAAACAGCCATATTATTTTGCCATAAC	46
AACAACAGGAAGCACGTCCTTGCTGGTAATATCCAGAAACGC	42
ACAACGCCTGTAGCATTTACCGTATAGGAAG	31
CCGTGTGATAAATAACCTCCGGCTGATG	28
AGAATTTTAGAGGAAAACAATATTACCGCCAGCTGCTCATTT	42
AGAACTTAGCCTAATTATCCCAAGCCCCCTTATTAGCGTTTGCCA	45
CATCGAGATAACGTCAAACATAAAAGAGCAAAAGAATT	38
TTACCATTAGCAAGGCCTTGAATTAGAGCCAGCCCGACTTGAGC	44
GACAATTACGCAGAGGCATTTTCGAG	26
AATATTCATTGAATCCATGCTGGATAGCGTCCAAT	35
TTAACTCGGAATTAGAGTAAATCAATATATGTGAGTGATTCT	42
CGTGTCAAATCACCATCTAGGTAATAGATTT	31
TATCAGCAACCGCAAGAATGCCAATGAGCCTGAGGATCTATC	42
GGGATATTGACGTAGCAATAGCTAAGATAGC	31
TAAGTTTACACTGAGTTTCGT	21
ATTGCGTTGCTGTTATCCGCTCACAATTCCAAACTCACTTGCGTA	45
GCTGGCATAGCCACATTATTC	21
CGTACTATGGTAACCACTAGTCTTTAATGCGCGAACTGAATC	42
ACGGGCCGATAATCCTGAGAAGTGTTTTTATGGAGCTAACCG	42
CAAACGGAATAGGAAACCGAGGAATAAGAAATTACAAG	38
TCACAGCGTACTCCGTGGTGAAGGGATAGCTAAGAGACGAGG	42
TAACATCCAATAAATGCAAAGGTGGCATCAACATTATGAAAG	42
CAGCAGCGCCGCTTGTTTATCAGCTTCACGAAAAA	35
TAGCCCGGAATAGGTGTAAGGATAAGTGCCGTCGA	35
AAATGCGGAAACATCGGTTTTCAGGTTTAACGTCAGATTAAC	42
ATTTCAACCAAAAATTCTACTAATAGTTAGTTTCATTTGGGGCGCGAGC	49
TGCTGATTGCCGTTGTCATAAACATCGGGCGG	32
GGCTAAAACTTCAGAAAAGTTTTGCGGGAGATAGAACC	38

GAGTCTGGATTTGTTATAATTACTACATACACCAC	35
ATTGTTATCTGAGAAGAAACCAGGCAAAGCGCCATTCGTAGA	42
CGGAATAGAAAGGAATGCCTTGCTAAACAACTTTCAAC	38
CTAGTCAGTTGGCAAATCAACAGTCTTTAGGTAGATAACAAA	42
AGTCGCCTGATACTTGCATAACAGAATACGTGGCACAGCTGA	42
CACGGCAACAATCCTGATATACTT	24
CCTCATCACCCCAGCAGGCCTCTTCGCTATTACGCCAGTGCC	42
TGAGCAAATTTATACAGGAATAACATCACTTGCCTGAGTCTT	42
AATAGAAAAAAATAAACGTCTGAGAGGAATATAAGAGCAACACTATGAT	49
ATTACGAGATAAATGCCAGCTTTGAGGGGACGACGACAG	39
GCTGGTCTGGTCAGGAGCCGGAATCCGCCGTGAACAGTGCCA	42
CTTGTAGAACGTCAGCGGCTGATTGCAGAGTTTTTCGACGTT	42
ACATAAAGCCCTTACACTGGTCGGGTTAAATTTGT	35
TGCCATCCCACGCAGGCAGTTCCTCATTGCCGTTTTAAACGA	42
GCCAGCAGTTGGGCGCAAATCAGGTTTCTTGCCCTGCGTGGT	42
TACGGCTGGAGGTGCGCACTCGTCACTGTTTGCTCCCGGCAA	42
GAGAGATAGACTTTACGGCATCAGA	25
AGAGAAAATCCTGTTTGA	18
GGCCAACGCGCGGGGAGGGCCCTGTGTTTGA	31
TTCGGGGTTTCTGCCAGGCCTGTGACGATCC	31

Table S2. Staples from the 5’ to the 3’ end for the DNA origami pillar for AgNP binding, for surface immobilization and dye-modified staple.

TGCATTAATGAGCGGTCCACGCTCACTGCGCCACGTGCCAGC$(A)_{20}$	62
AGCGCAGCTCCAACCGTAATCATGGTCACGGGAAACCT$(A)_{20}$	58
GCGTCCACTATTCCTGTGTGAAATGCTCACTGCC$(A)_{20}$	54
TGGTGGTTGTTCCAGTTTGGAACA$(A)_{20}$	44
GGATGTGGTTTGCCCCAGCAG$(A)_{20}$	41
CGCTTTCCAGTTAGCTGTTTAAAGAACGT$(A)_{20}$	49
Biotin- ATTAGCGGGGTTTTGCTCAGTACCAGGCTGACAACAAGCTG	41
Biotin- TGCCCGTATAAACAGTGTGCCTTCTGGTAA	30
Biotin- AGAAAACGAGAATGACCATAAATCTACGCCCCTCAAATGCTTTA	44
Biotin- ATAACTATATGTAAATGCTTAGGATATAAT	30
Biotin- AGGAATCATTACCGCGTTTTTATAAGTACC	30
Biotin- GATTAGAGAGTACCTTAACTCCAACAGG	28
Biotin- CCTTAAATCAAGATTAGCGGGAGGCTCAAC	30
Biotin- GCATGTAGAAACCAATCCATCCTAGTCCTG	30
AGAGAAAATCCAGAGAGTTGCAGCAAATC-Alexa488	29