Supporting Information for

A dual-targeting fluorescent probe for simultaneous and discriminative visualization of lipid droplets and endoplasmic reticulum

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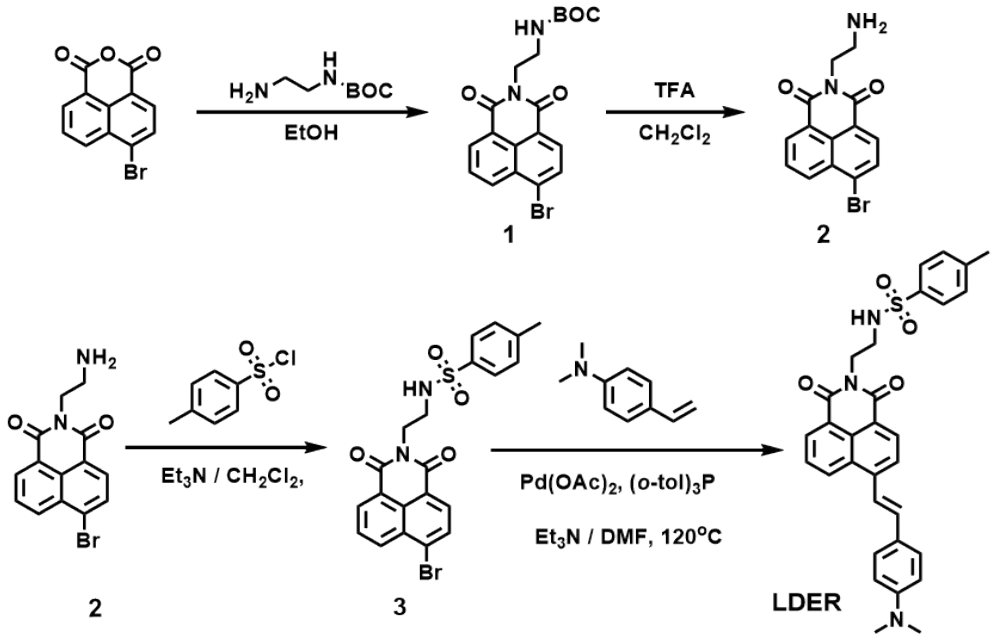
Synthesis



Scheme S1. Synthetic route of **LDER**.

Synthesis of compound **2**

4-Bromo-1,8-naphthalic anhydride (0.82 g, 3 mmol), N-Boc-Ethylenediamine (0.48 g, 3 mmol) in EtOH (10 mL) were stirred at 80 ^{0}C for 8 h. After being cooled to room temperature, the precipitate washed three times with EtOH to provide crude compound **1**. Compound **1** was dissolved in CH_2Cl_2, stirred at room temperature, TFA was added to the mixture, and the compound **2** was obtained。^{1}H NMR (400 MHz, DMSO-d_6), δ (ppm): 8.63 (d, 1H), 8.60 (d, J=4 Hz, 1H), 8.37 (d, J=12 Hz, 1H), 8.26 (d, J=12 Hz,1H), 8.05 (t, J =8 Hz, 1H), 7.81 (s, 2H), 4.32 (d, J=6 Hz, 2H), 3.16 (t, J=8 Hz, 2H).

Synthesis of compound **3**

Compound **2** (0.64 g, 2 mmol) and *p*-toluene sulfochloride (0.38 g, 2 mmol) dissolved in CH_2Cl_2 (10.0 mL), 200 μL NEt_3 was added then the solution stirred for 5 h at room temperature。The resulting compound was purified by silica gel chromatography with CH_2Cl_2/CH_3OH (30:1) as the eluent to yield Compound **3** as a yellow solid (70%). ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.58-8.54 (m, 2H), 8.29 (t, J = 12 Hz, 2H), 8.01 (t, J = 8 Hz, 1H), 7.76 (t, J = 8 Hz, 1H), 7.55 (d, J = 8 Hz, 2H), 7.18 (d, J = 8 Hz, 2H), 4.10 (t, J = 8 Hz, 2H), 3.08-3.05 (m, 2H), 3.23 (s, 3H).

Table S1 The photophysical properties of **LDER**

Solvents	λ_{abs}/nm	λ_{em}/nm	Stokes shift/nm	Φ_f(%)	$E_T(30)$ kcal/mol	Dielectric constant (ε)
Toluene	468	586	118	7.40	33.9	2.38
Dio	464	596	132	5.83	36	2.25
THF	470	622	158	3.50	37.4	7.58
EA	465	625	160	1.18	38.1	6.03
$CHCl_3$	483	628	145	1.24	39.1	5.20
DCM	483	634	151	0.73	40.7	8.93
Ace	468	641	173	0.03	42.2	20.7
DMSO	484	646	162	0.003	46.7	46.7

λ_{abs}: absorption maximum. λ_{em}: fluorescence maximum. Φ_f: the fluorescence quantum yield determined by using fluorescein (Φ_f=0.95) in aqueous NaOH (pH = 13) as the standard. Concentration = 10 μM. $E_T(30)$ and Dielectric constant (ε) of each solvent were collected from reference.

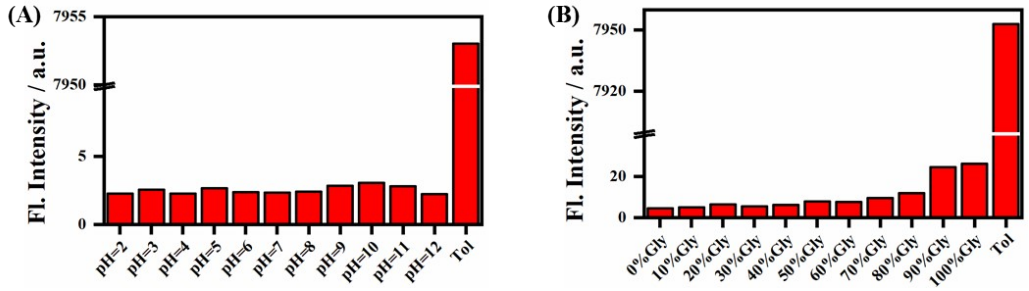


Fig. S1 The Fluorescence intensity of **LDER** in PBS buffer at different pH (A) and in Gly-H_2O mixtures with different viscosity (B). Concentration = 10 μM.

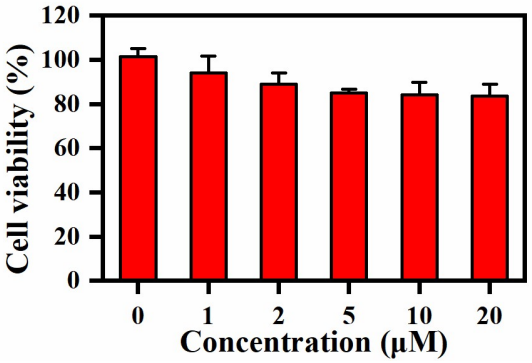


Fig. S2 Cytotoxicity of **LDER** at various concentrations (0 μM, 1 μM, 2 μM, 5 μM, 10 μM, 20 μM) towards SiHa cells for 24 h.

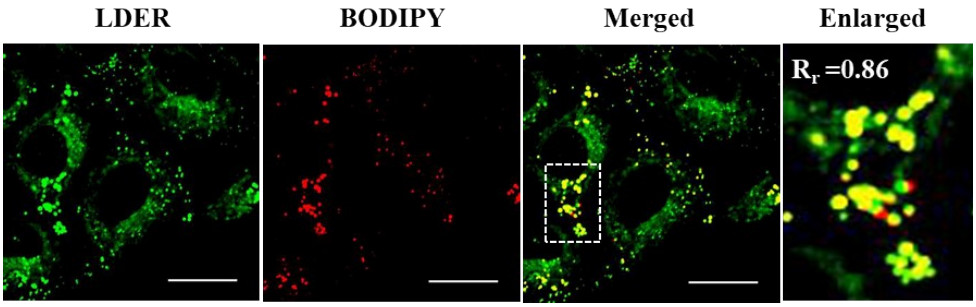


Fig. S3 Fluorescent images of **LDER** co-stained with BODIPY 493/503 in living SiHa cells. **LDER**: λ_{ex} = 473 nm, λ_{em} = 600-650 nm; BODIPY 493/503: λ_{ex} = 473 nm, λ_{em} = 500-530 nm. Scale bar = 20 μm.

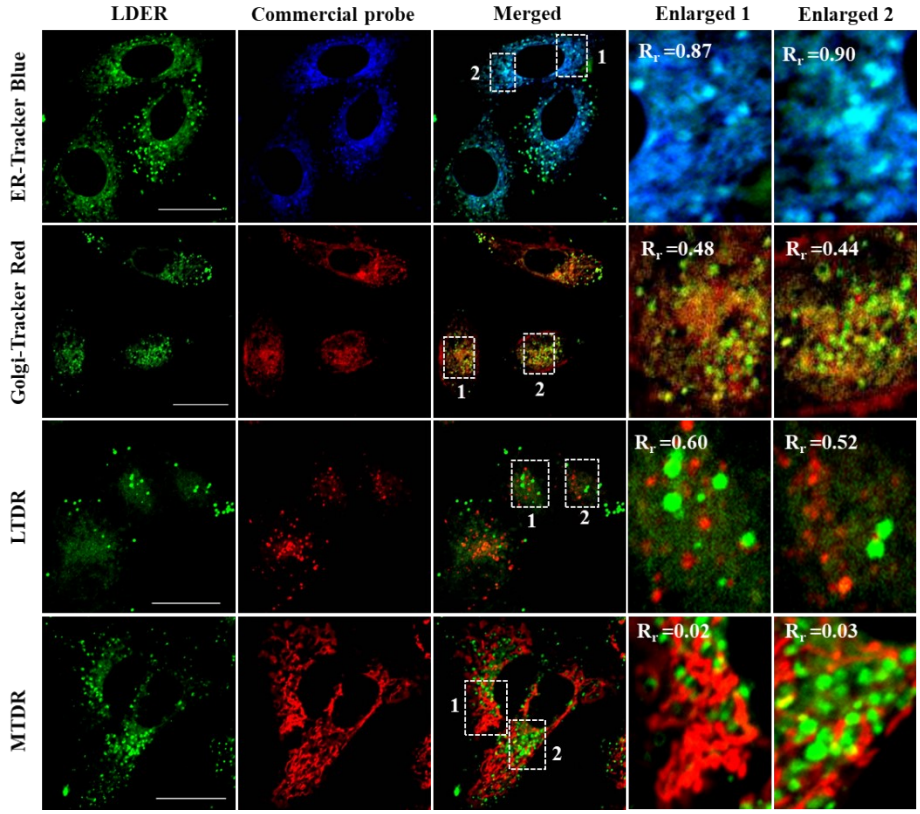


Fig. S4 Fluorescent images of **LDER** co-stained with ER-Tracker Blue, Golgi-Tracker Red, LTDR and MTDR in living SiHa cells. Scale bar = 20 μm.

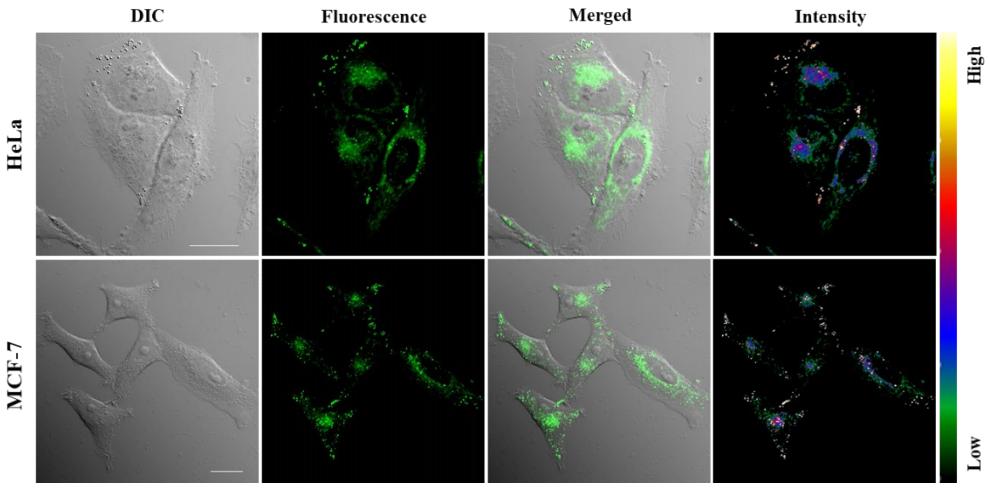


Fig. S5 Fluorescent images of **LDER** in living HeLa and MCF-7 cells. The rainbow color represented the fluorescence intensity. Scale bar = 20 μm.

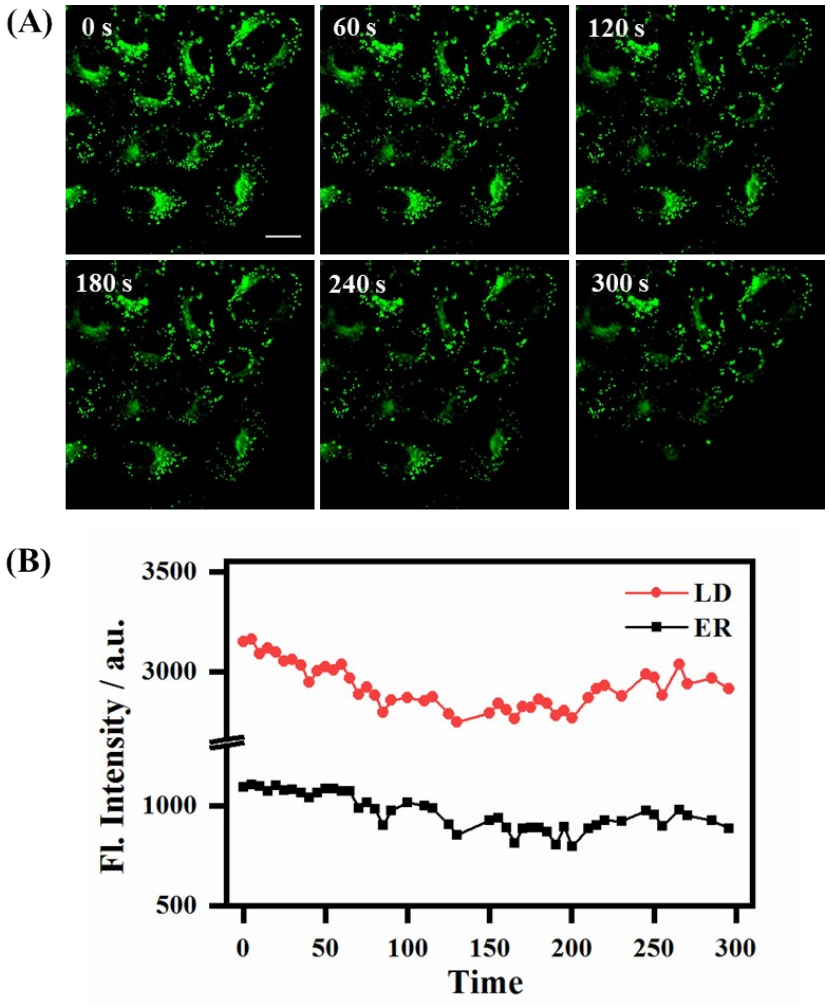


Fig. S6 Fluorescent images (A) of SiHa cells stained with **LDER** under continuous light conditions and the corresponding fluorescence intensity (B). Scale bar = 20 μm.

Spectral Characterization

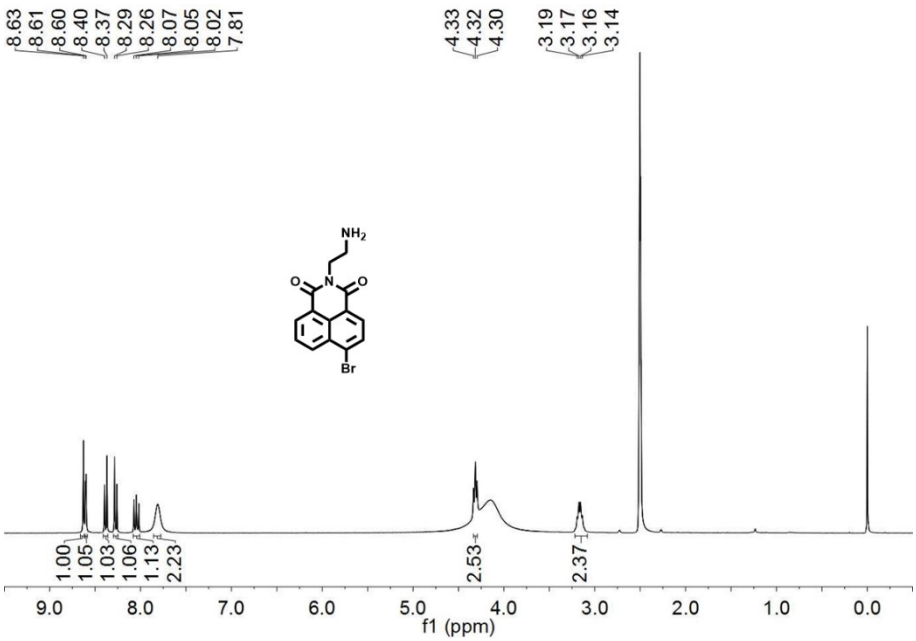


Fig. S7 ^{1}H NMR spectrum of compound **2** in DMSO-d_6.

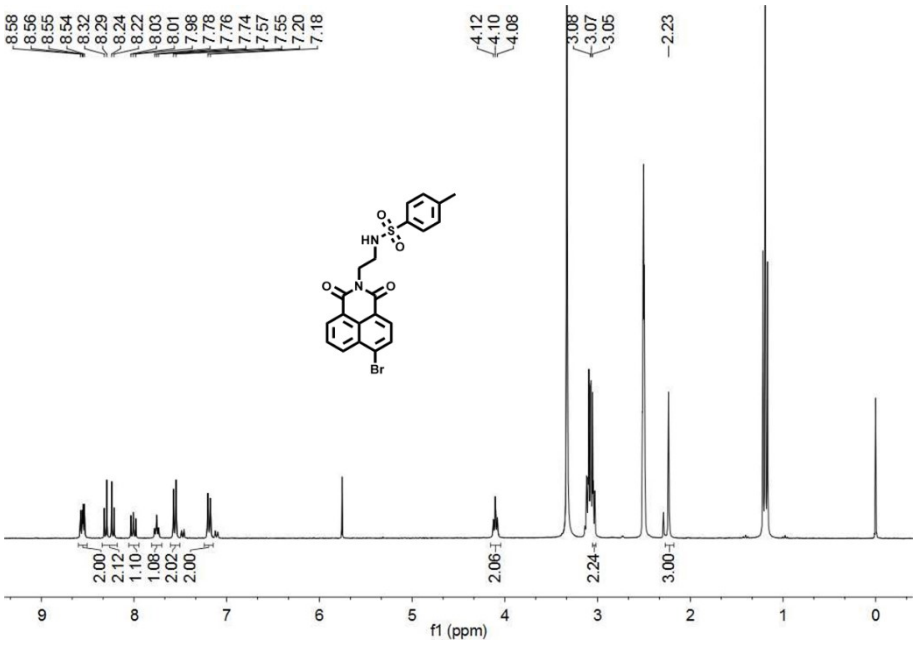


Fig. S8 ^{1}H NMR spectrum of compound **3** in DMSO-d_6.

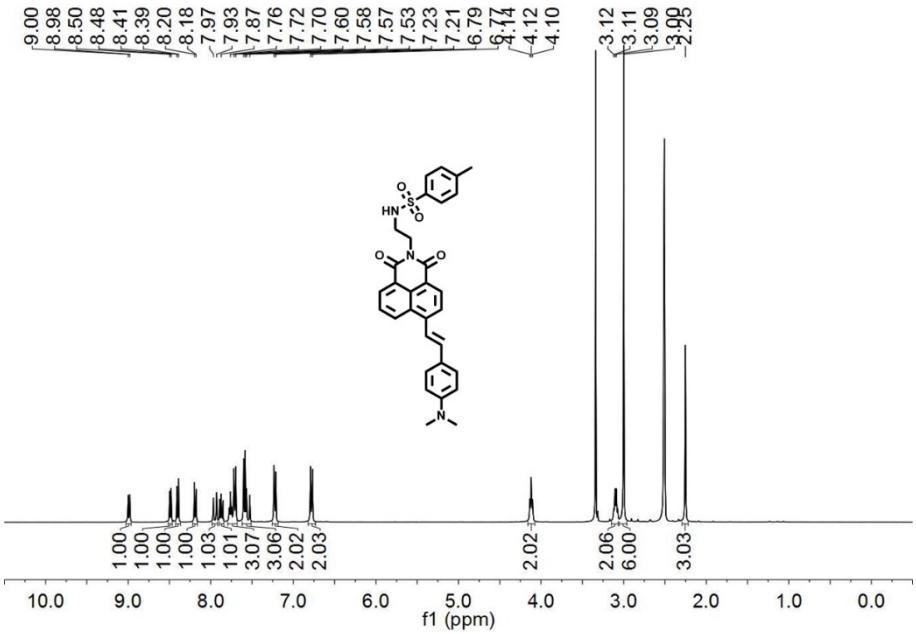


Fig. S9 [1]H NMR spectrum of probe **LDER** in DMSO-d_6.

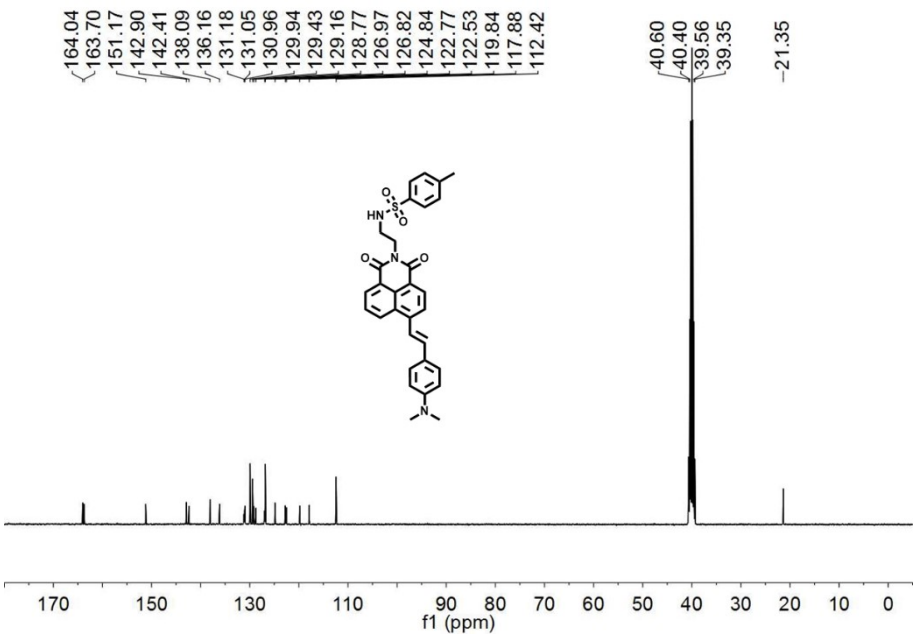


Fig. S10 [13]C NMR spectrum of probe **LDER** in DMSO-d_6.

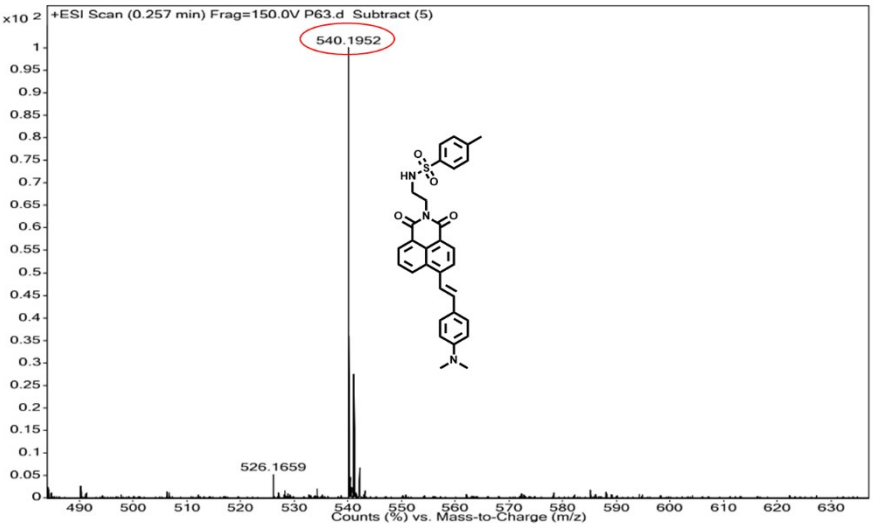


Fig. S11 HRMS spectrum of probe **LDER**.