

PLAN

- Mesures de tension
- Mesures de courant

Préambule

- **Pour les mesures de tension**
 - Minimiser les longueurs de câble entre le « pulseur » et le réacteur.
 - Toujours faire la prise de référence (masse) au plus près du réacteur ainsi que la prise de tension.
- **Pour les mesures de courant**
 - Toujours prendre la mesure sur le retour de masse pour ne pas perturber
 - Toujours prendre la mesure au plus près du réacteur

Sondes de tension

$\leq 500V$



Atténuation 10x

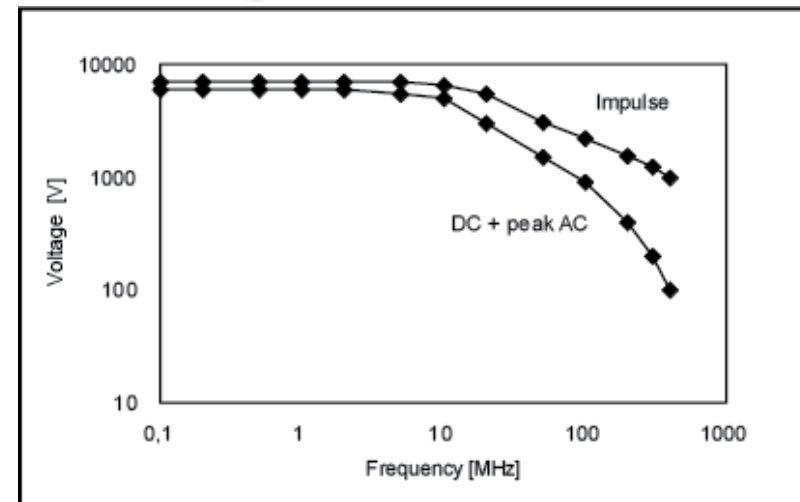
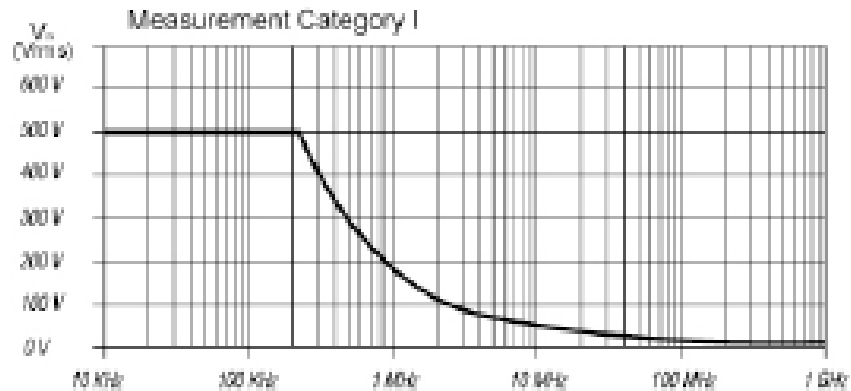
$Z_i = 10M\Omega$ et 10pF

$\leq 6kV$



Atténuation 100x
1000x

$Z_i = 50M\Omega$ et 6pF



Sondes de tension

$\leq 20\text{kV DC}$ ou 40kV Pulse



Atténuation 1000x
 $Z=100\text{M}\Omega$

De 40 à 300kV DC ou 60 à 550kV Pulse



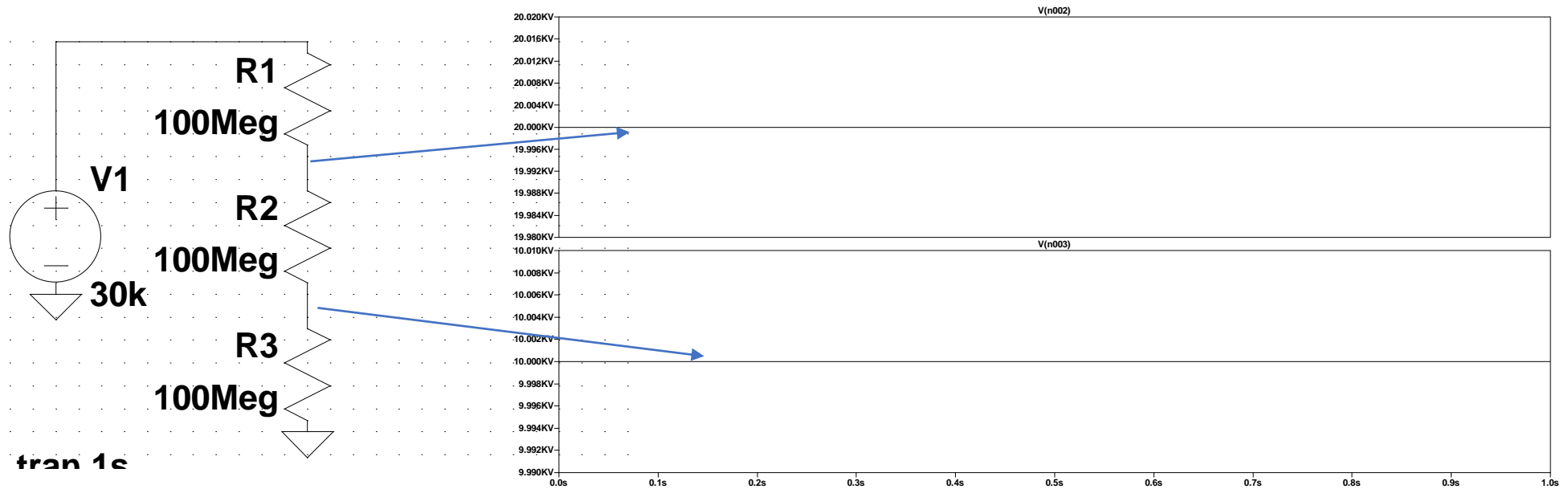
Atténuation 1000x
 $Z=100\text{M}\Omega$ ou plus

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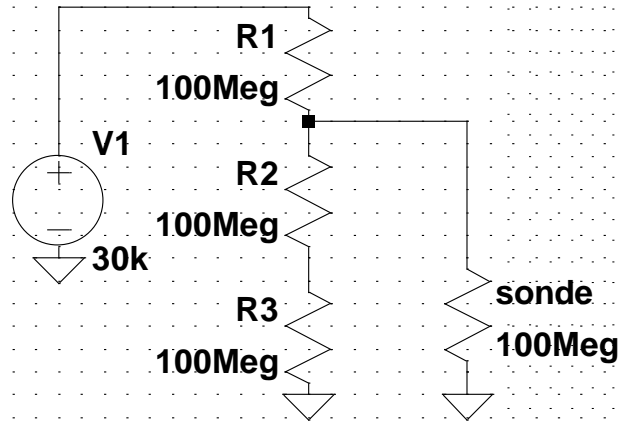
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Attention à la mesure

- Simulation avec LTspice

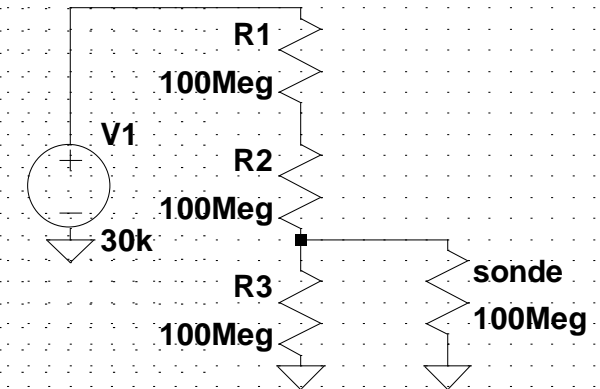


Les mesures avec une sonde



$$V(R2) = (V1 * 66\text{Meg}) / 166\text{Meg}$$

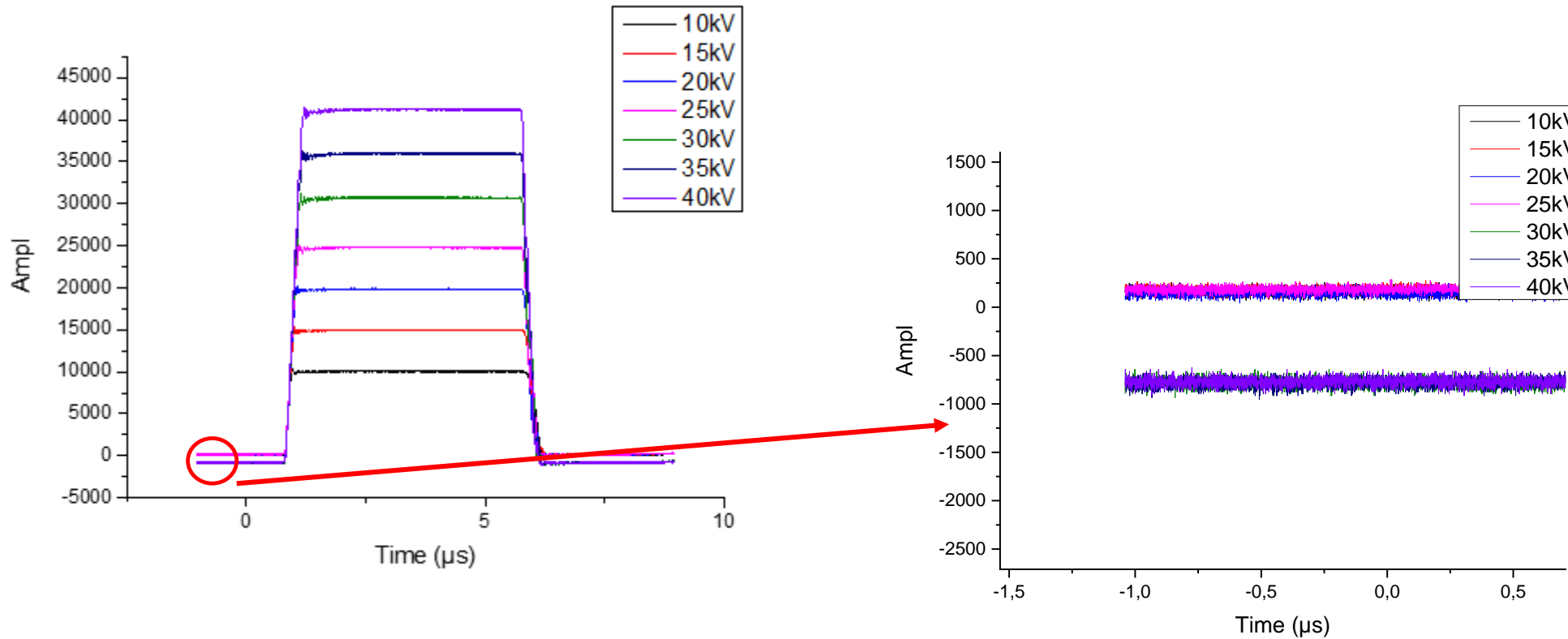
Mesure 12 kV

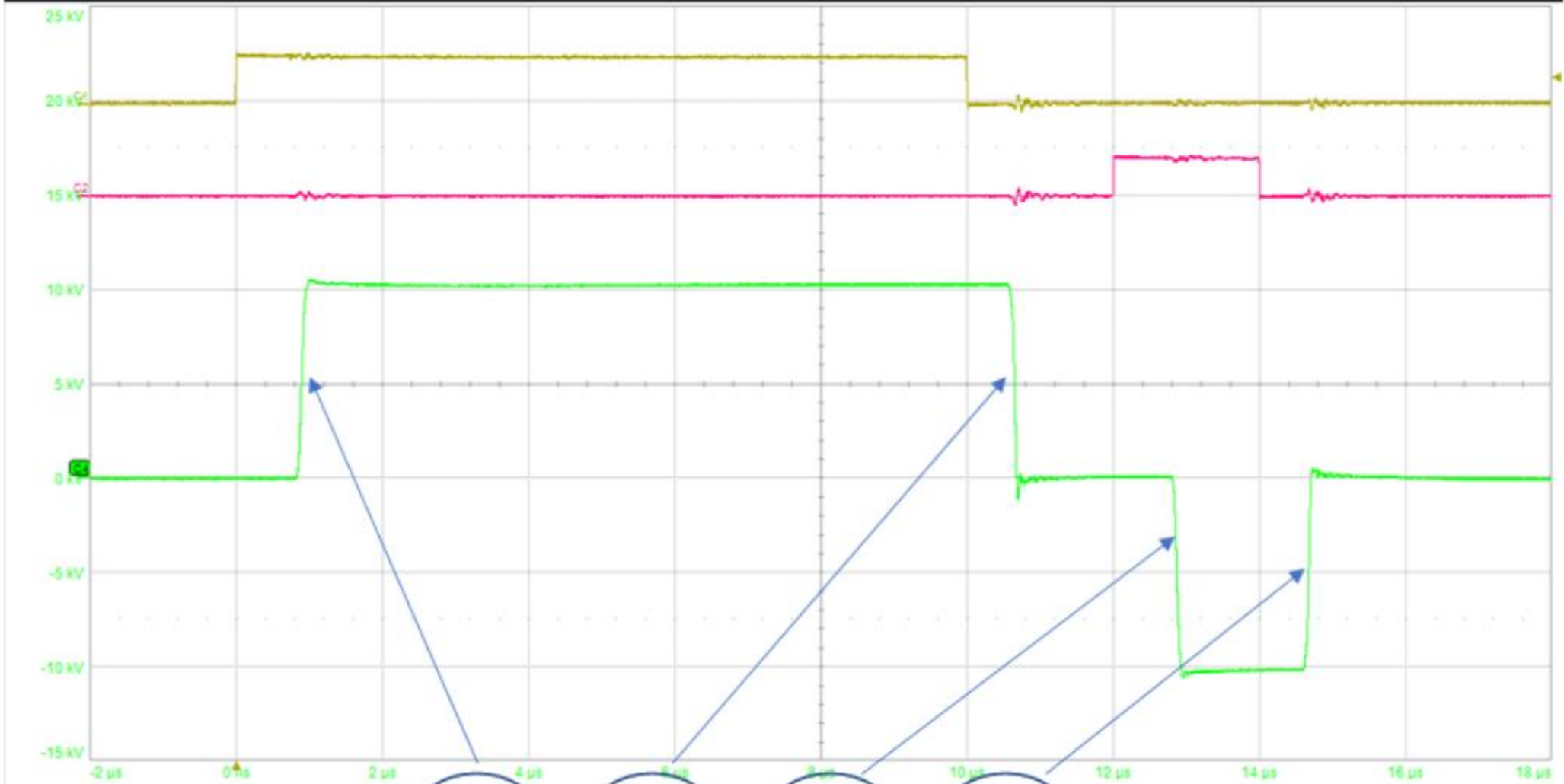


$$V(R3) = (V1 * 50\text{Meg}) / 250\text{Meg}$$

Mesure 6kV

Les mesures avec une sonde



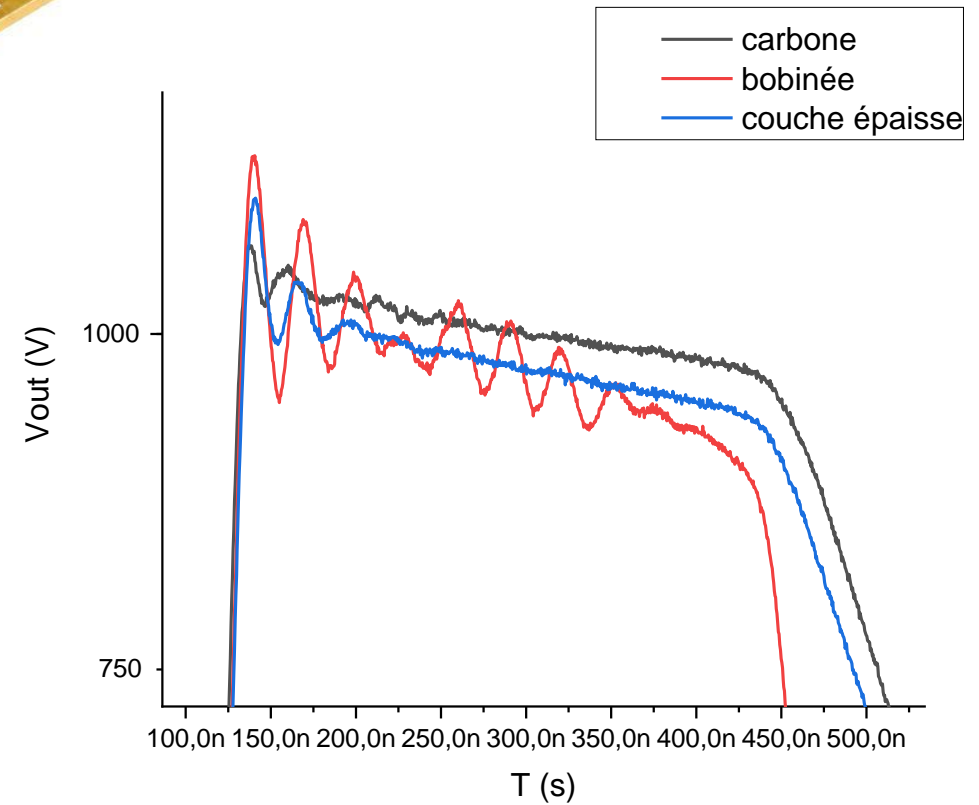
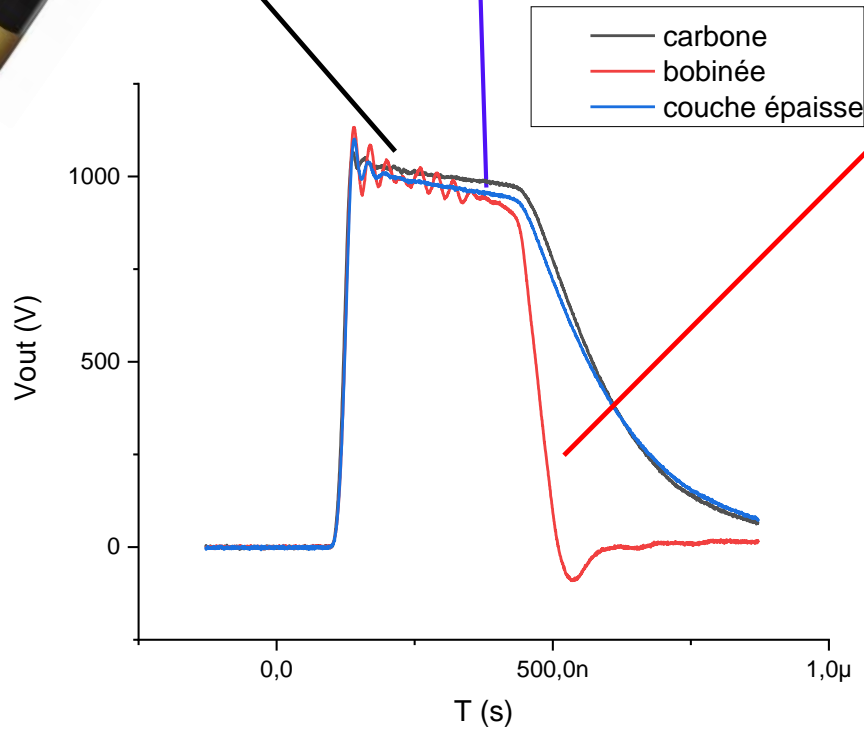


Measure	P1:width(C3)	P2:rise(C4)	P3:fall(C4)	P4:fall(C4)	P5:rise(C4)	P6:freq(C3)	P7:---	P8:---
value		78.447 ns	62.298 ns	76.563 ns	62.875 ns			
status		✓	✓	✓	✓			

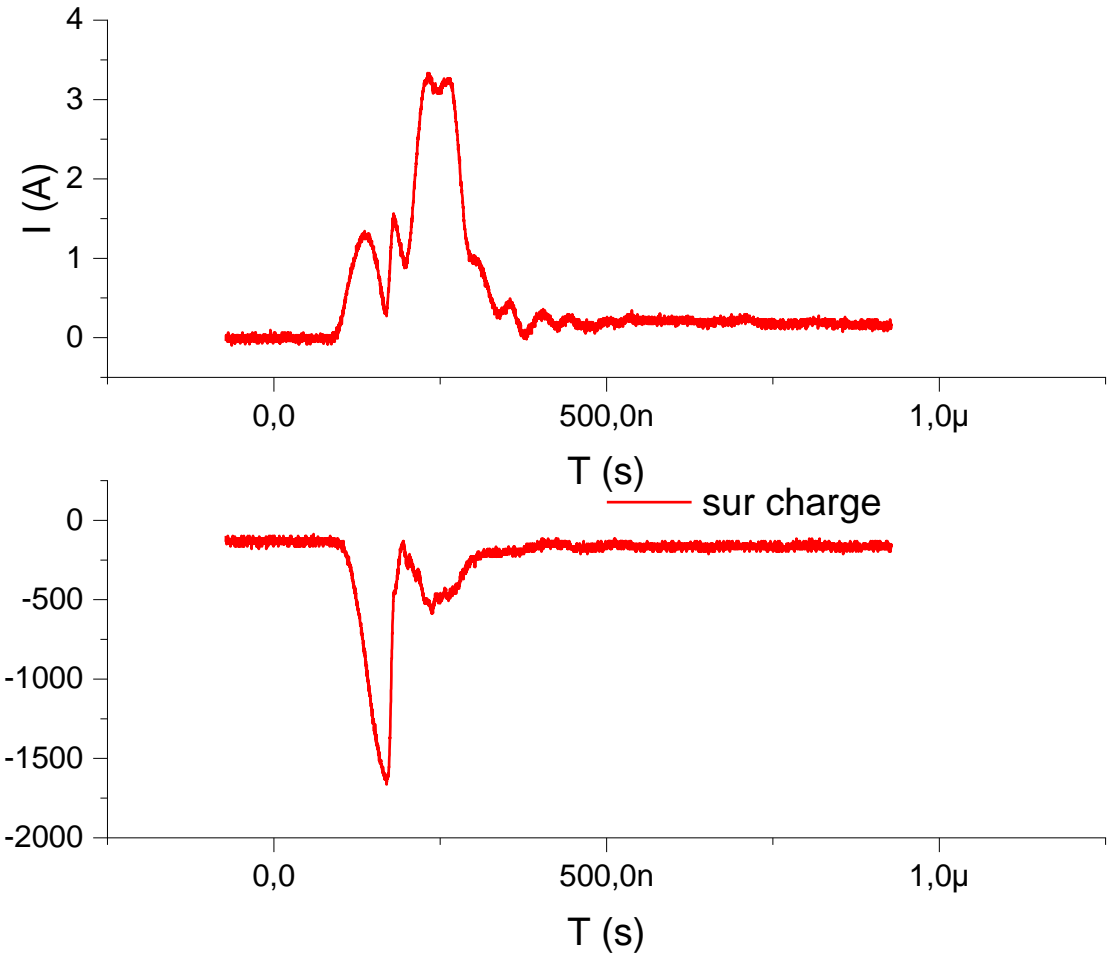
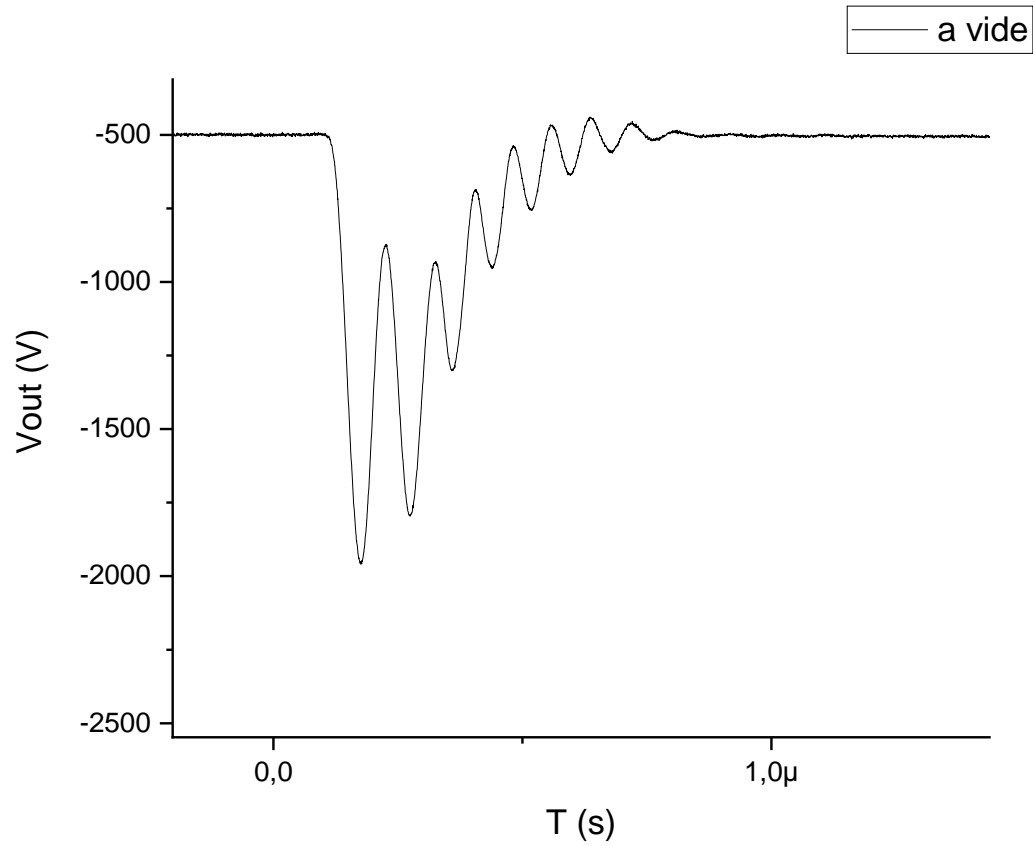
C1	C2	C3
10.0 V/div	10.0 V/div	5.00 kV/div
29.640 V	19.880 V	-5.000 kV

Tbase	-8.00 μs	Trigger	UI
	2.00 μs/div	Stop	2.9 V
	50 kS	Edge	Positive

Influence de la charge



Influence de la charge



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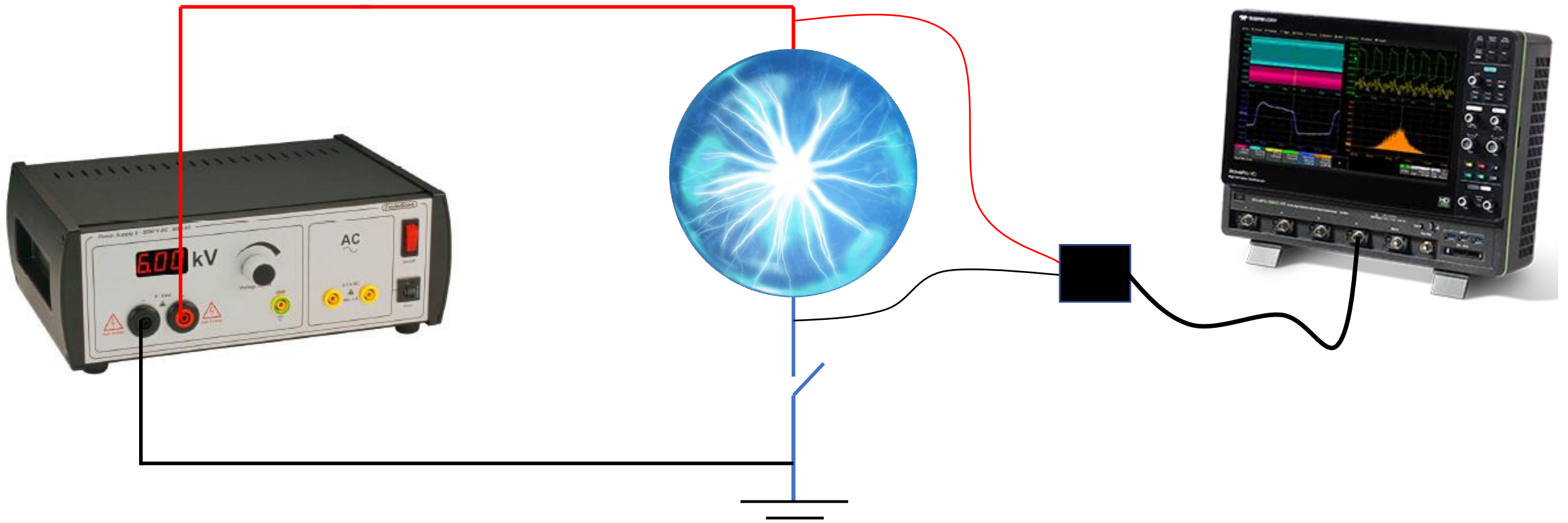
Sondes différentielles



6kV max

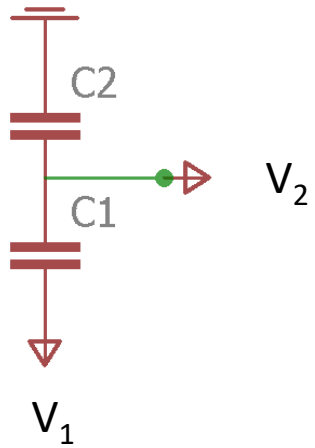
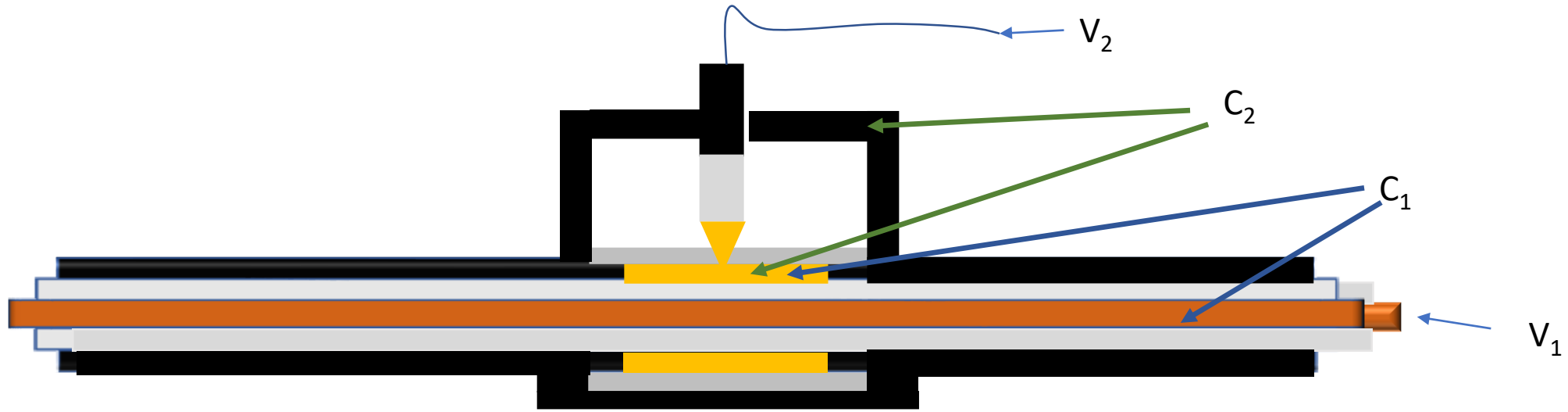
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Sondes différentielles



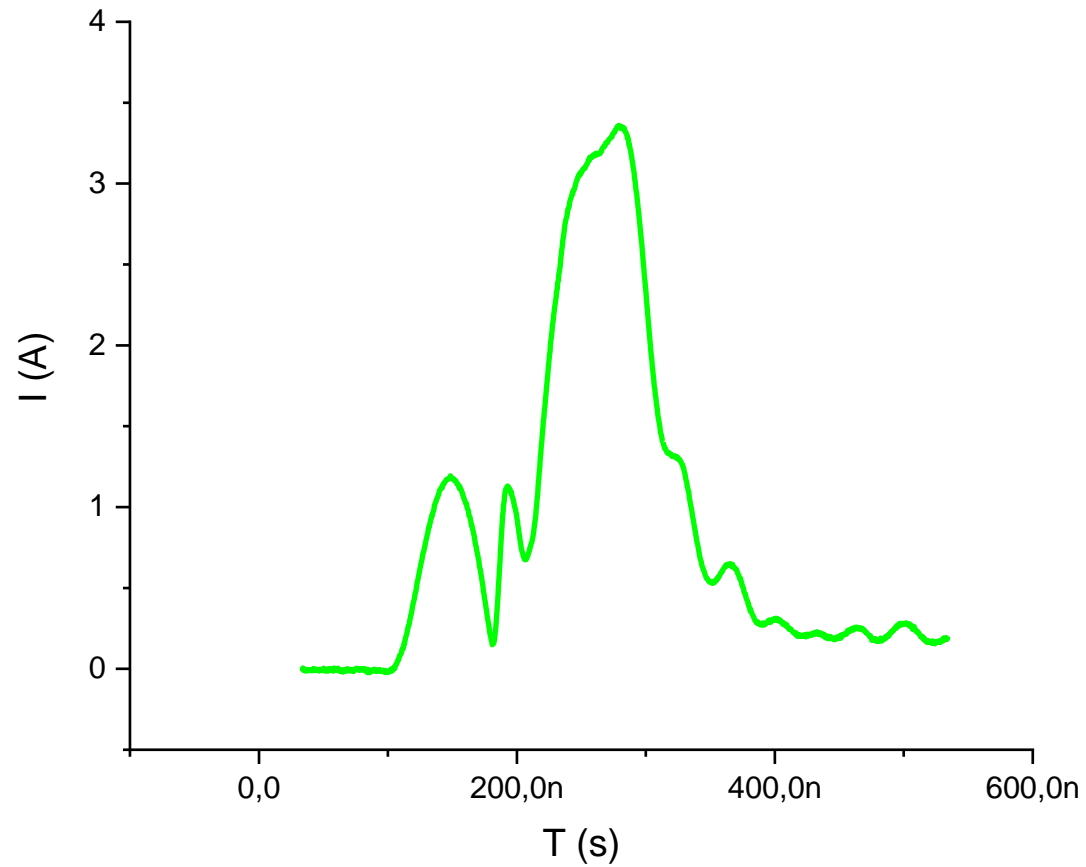
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Sonde capacitive



$$V_2 = \frac{1}{Att_{sonde}} \frac{C_1}{C_1 + C_2} V_1$$

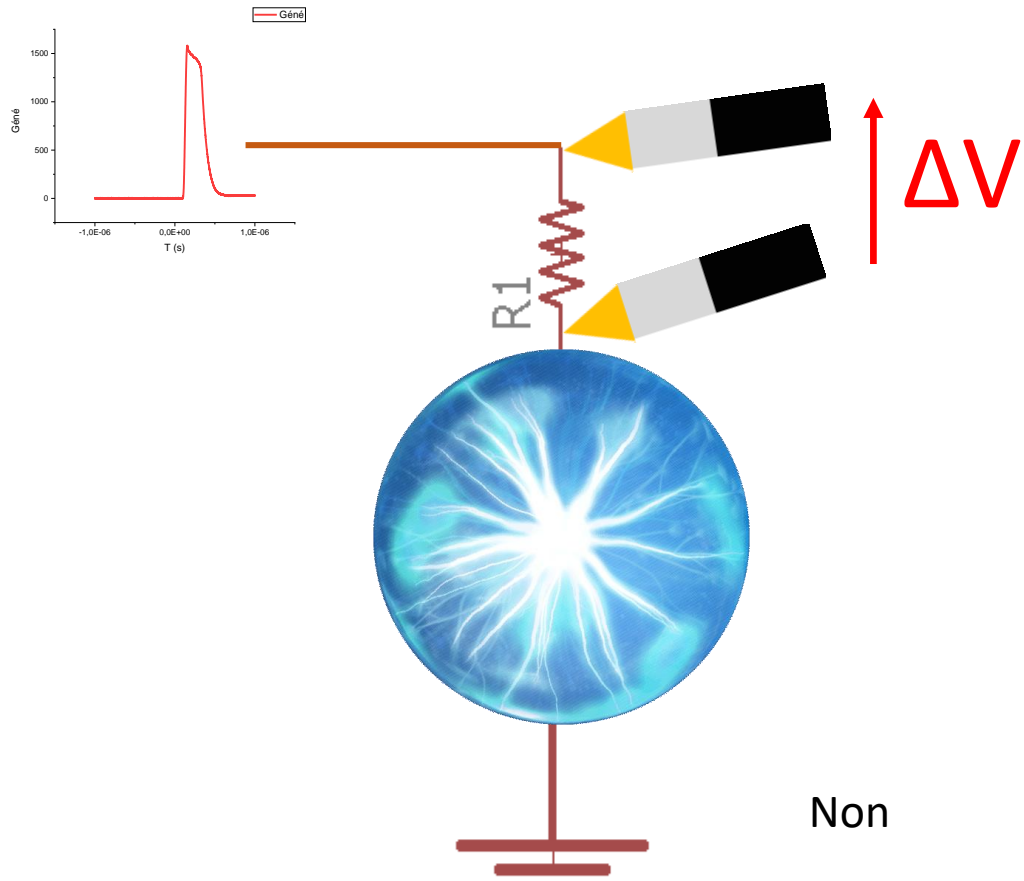
Les mesures de courant



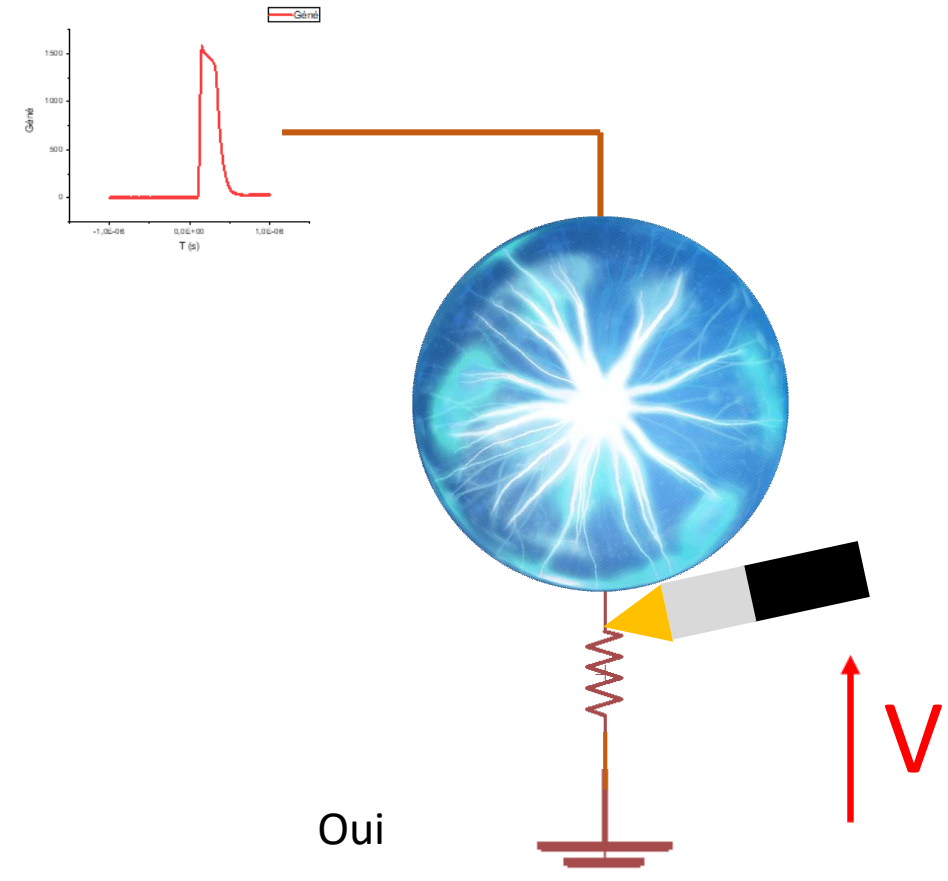
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Mesures de courant



Non



Oui

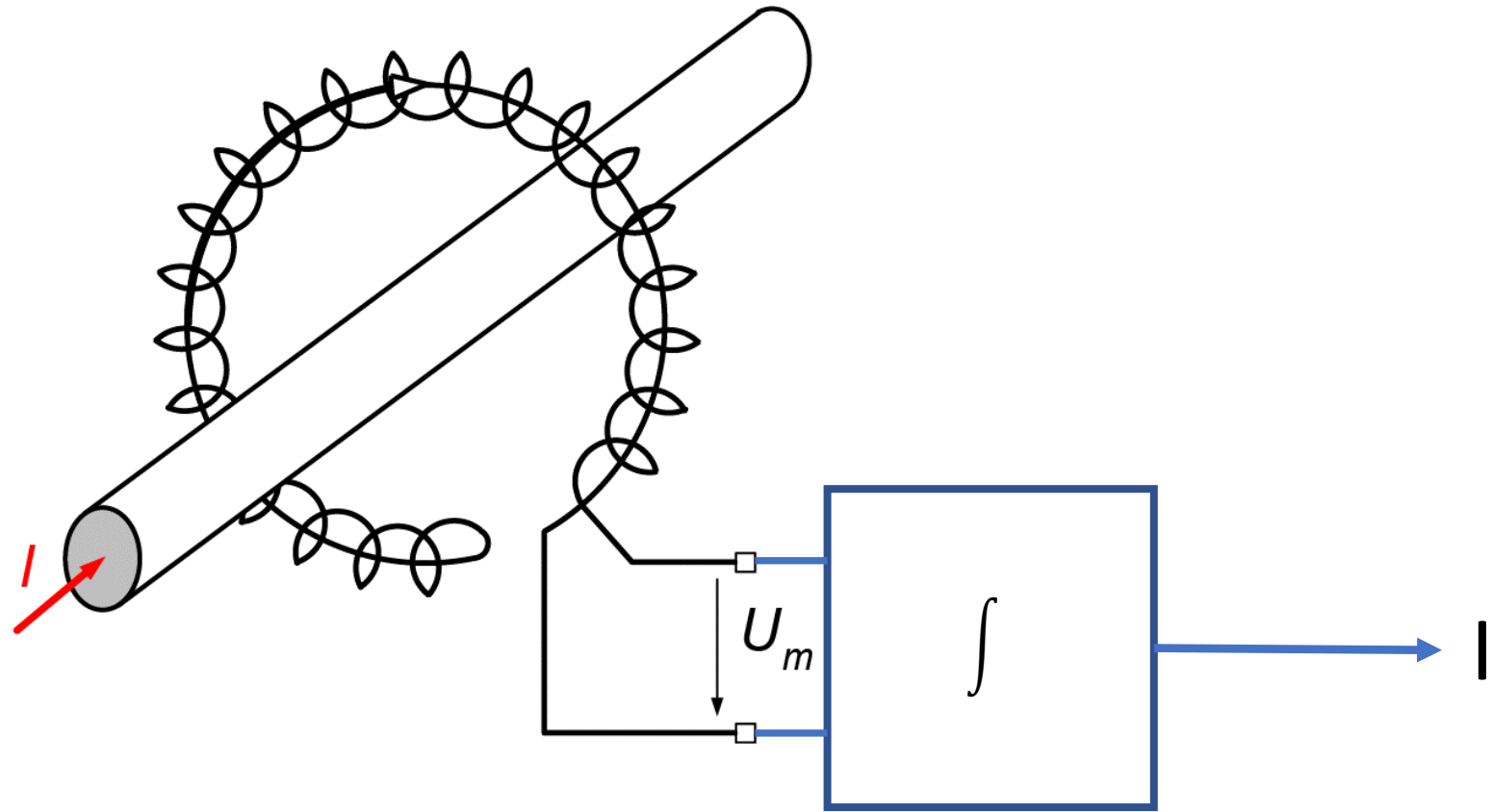
Mesures de courant



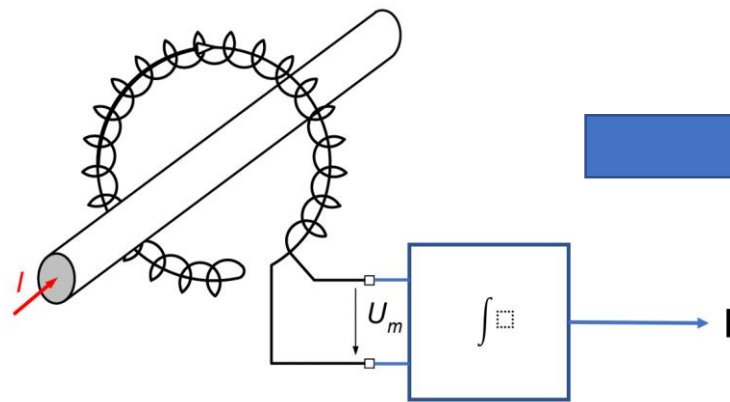
Coaxial Shunts T&M

Model	Resistance ohms	Bandpass MHz.	Risetime nsec.	E _{max} joules
SDN-414-01	.01	400	1	6
SSDN-414-01	.01	400	1	6
SPT-414-01	.01	400	1	6
SDN-414-025	.025	1200	0.3	3
SSDN-414-025	.025	1200	0.3	3
SPT-414-025	.025	1200	0.3	3

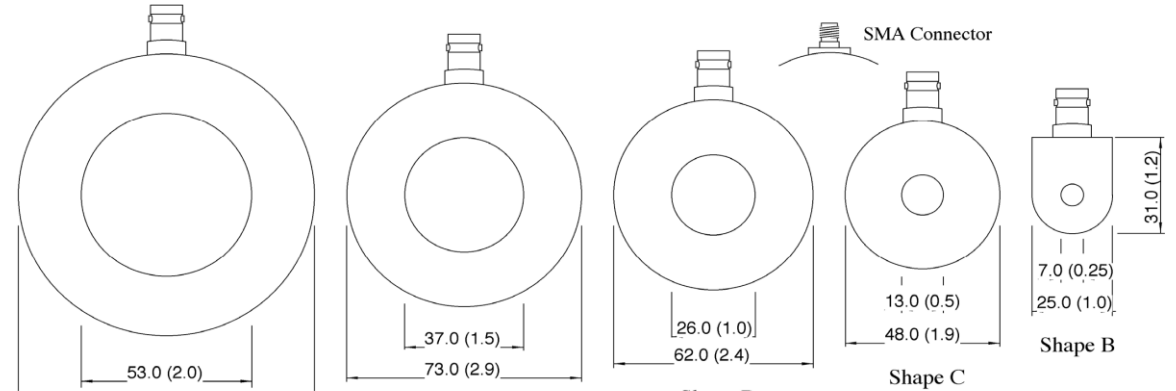
Enroulement de Rogowski



Enroulement de Rogowski



Dimensions



Mesures de courant

Unit height : 17mm (0.67"), models C,D,E & F, 15mm (0.60") model B

Dimensions in mm (inches)

Model	Output (V/A)		Max rms (A)	Max Peak (A)	Droop (%/us)	Rise (ns)	Max l.t * (As) in 50Ω	-3db low (Hz)	-3db high (MHz)
	in 1MΩ	in 50Ω							
CT-B5.0	5.0	2.5	2	200	3	0.875	0.0001	4800	400
CT-B2.5	2.5	1.25	5	400	0.75	0.7	0.0004	1200	500
CT-B1.0	1.0	0.5	8	1000	0.13	0.7	0.0025	200	500
CT-B0.5	0.5	0.25	11	2000	0.03	1.75	0.01	48	200
CT-B0.25	0.25	0.125	16	4000	0.015	3.5	0.04	24	100
CT-B0.1	0.1	0.05	25	10000	0.006	7	0.25	10	50
CT-B0.05	0.05	0.025	35	20000	0.003	17.5	1	5	20
CT-C5.0	5.0	2.5	2	200	3	0.875	0.0002	4800	400
CT-C2.5	2.5	1.25	5	400	0.75	0.7	0.0008	1200	500
CT-C1.0	1.0	0.5	11	1000	0.13	0.7	0.005	200	500
CT-C0.5	0.5	0.25	16	2000	0.03	1.75	0.02	48	200
CT-C0.25	0.25	0.125	22	4000	0.01	3.5	0.08	12	100
CT-C0.1	0.1	0.05	35	10000	0.004	7	0.5	6	50
CT-C0.05	0.05	0.025	50	20000	0.002	17.5	2	3	20
CT-D5.0	5.0	2.5	2	200	3	0.875	0.0002	4800	400
CT-D2.5	2.5	1.25	5	400	0.75	0.7	0.0008	1200	500
CT-D1.0	1.0	0.5	11	1000	0.13	0.7	0.005	200	500
CT-D0.5	0.5	0.25	16	2000	0.03	1.75	0.02	48	200
CT-D0.25	0.25	0.125	22	4000	0.01	3.5	0.08	12	100
CT-D0.1	0.1	0.05	35	10000	0.002	7	0.5	2	50
CT-D0.05	0.05	0.025	50	20000	0.001	17.5	2	1	20

Mesures de courant



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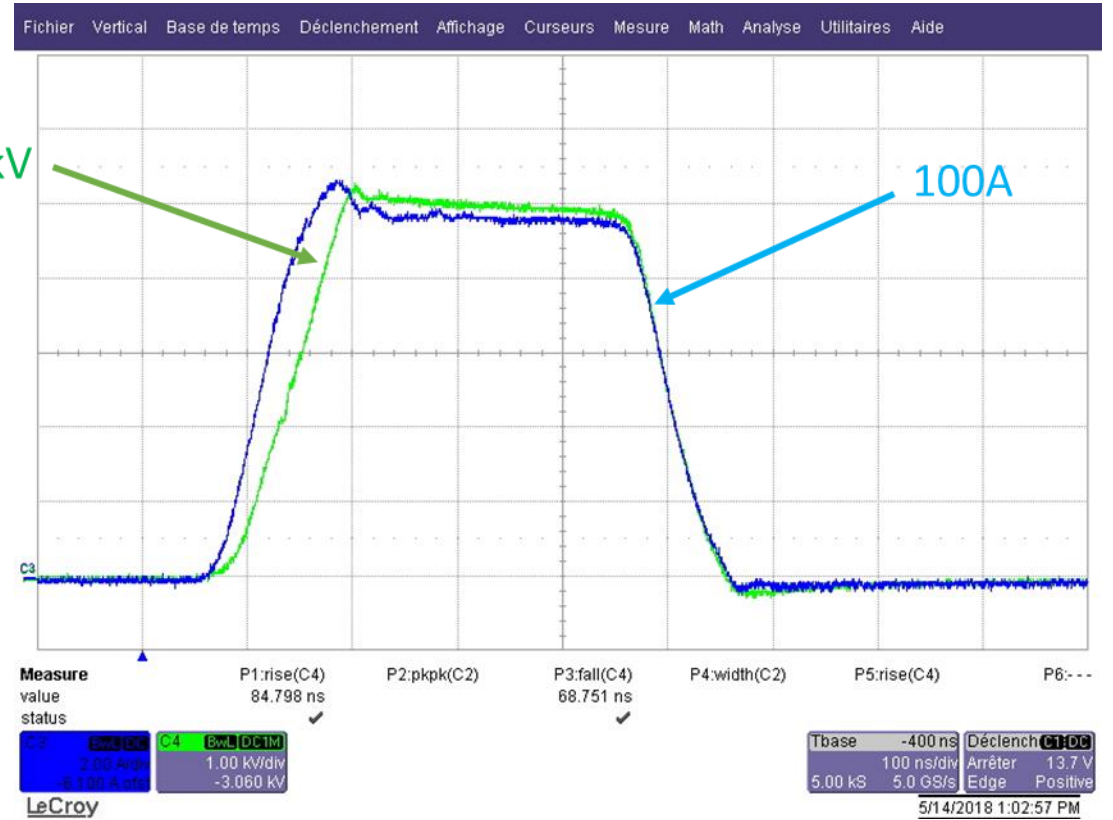
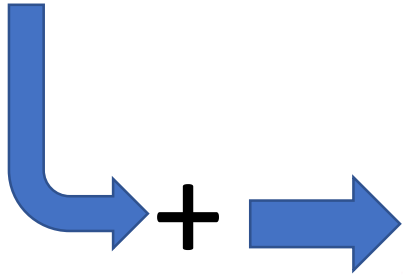
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Mesures de courant



Par exemple : 10 tours sur une résistance de 1Ω
La réponse est de 10 A/V

Mesures de courant



MERCI