



SOF recovery parameters during simulated driving

ALBA 2026, Mainz

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May 20, 2026

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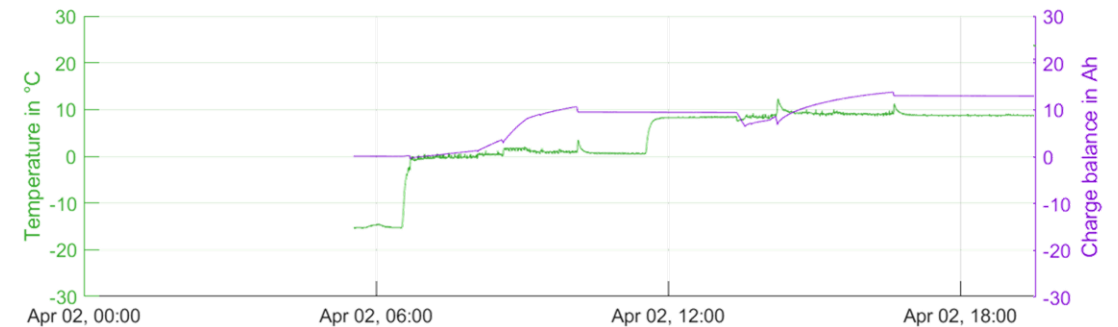
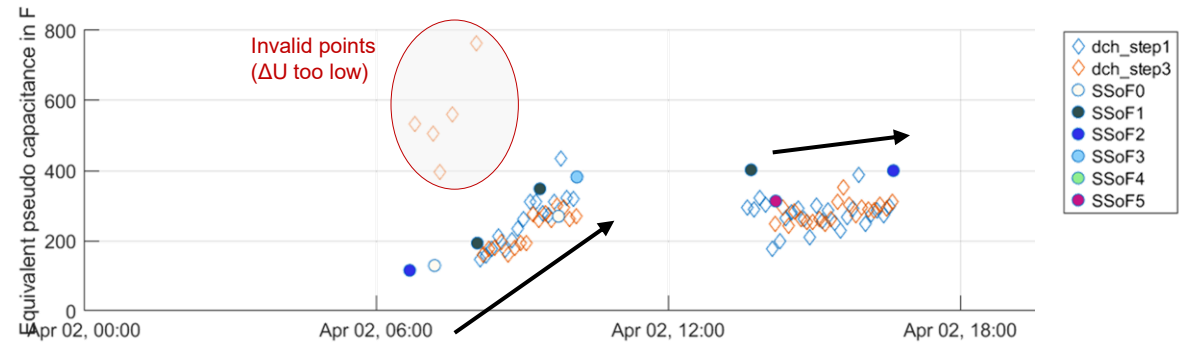
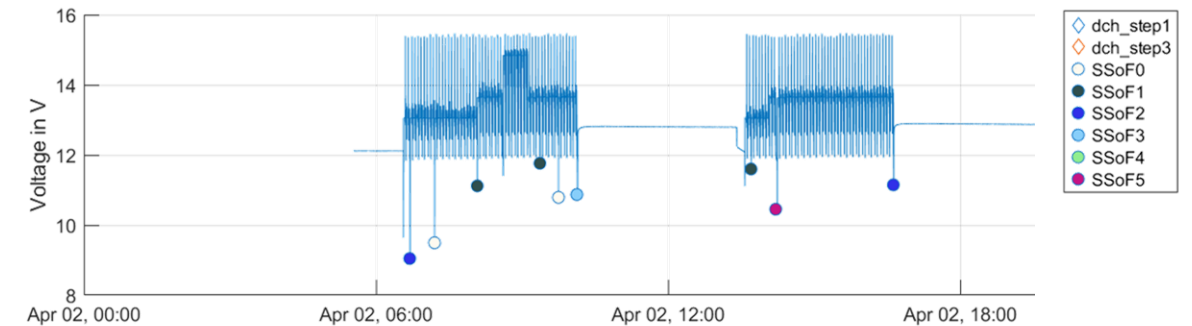
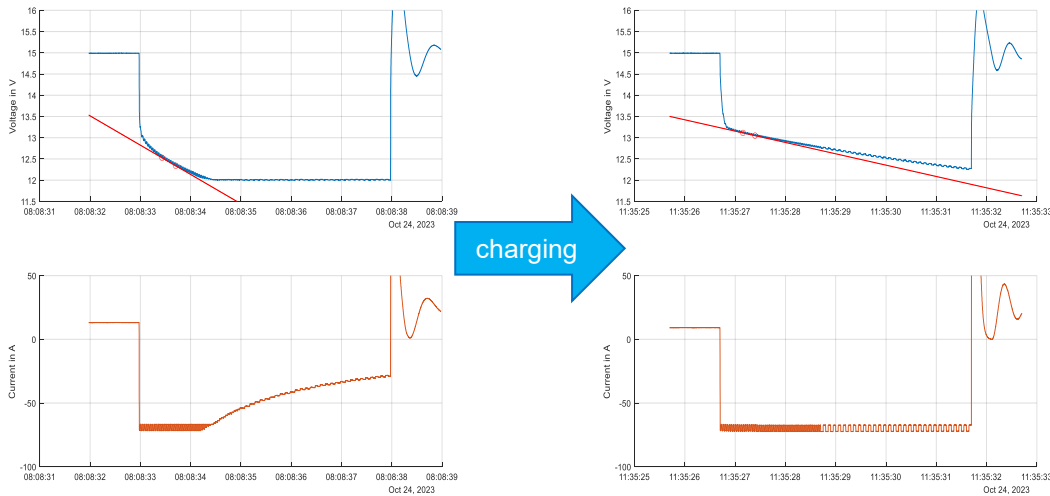
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Pseudo capacitance

- Extended evaluation of pseudo-capacitance evolution
 - Evaluation of discharge events extended to all types
 - Discharge steps without ramps (30A & 70 A)
 - SSoF0 to SSoF 5 events
 - Potential for determination from charging events



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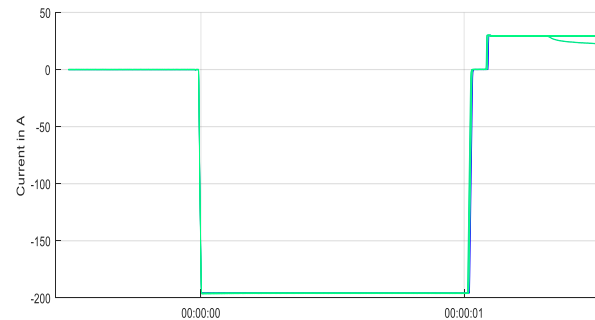
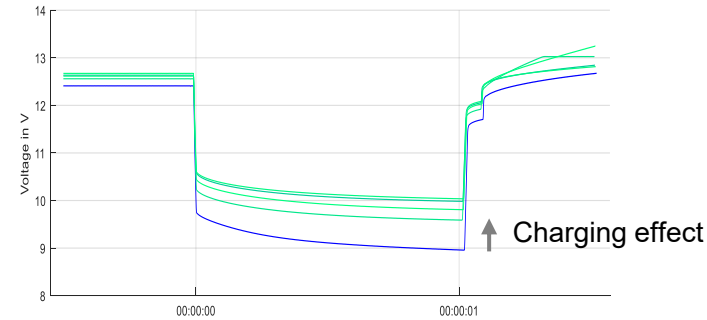
Voltage plateau

- General approach
 - Estimate SoC (Ah integration, initial SoC from OCV) and battery temperature (initially: $\tau = 2$ h)
 - Expected end voltage from PPC battery sizing tool
 - Compare to measured end voltage

Pulse	SoC	Temp	$U_{\text{end,ppc}}$	$U_{\text{end,meas}}$	ΔU
1	40%	-11 °C	8,97 V	8,96 V	-0,01 V
2	51%	-7 °C	9,37 V	9,98 V	+0,61 V
3	53%	-7 °C	9,41 V	10,04 V	+0,63 V
4	52%	-12 °C	9,15 V	9,59 V	+0,44 V
5	54%	-10 °C	9,29 V	9,72 V	+0,43 V

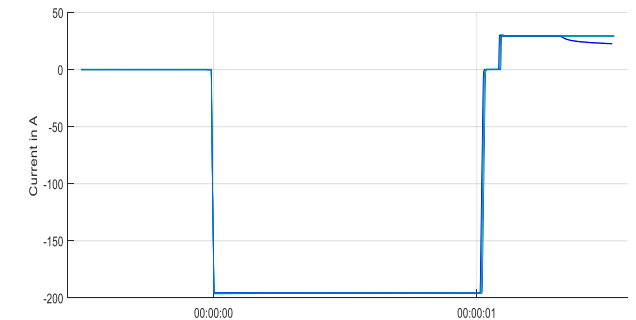
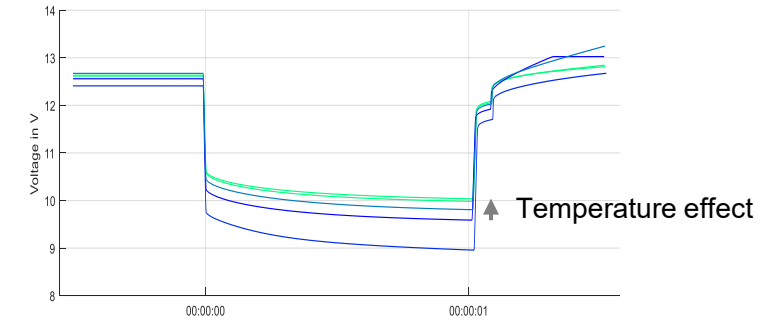
- Sensitivity analysis with PPC battery sizing tool
 - Temp: $\Delta U \approx 0.24$ V for -12...-7 °C @ 47% SoC ✓
 - SoC: $\Delta U \approx 0.27$ V for 40...54% @ -10 °C ?
 - Charging effect apparently higher than SoC effect alone

SoC as curve color



SoC = 40...54%
(charging from 38%)

Temperature as curve color



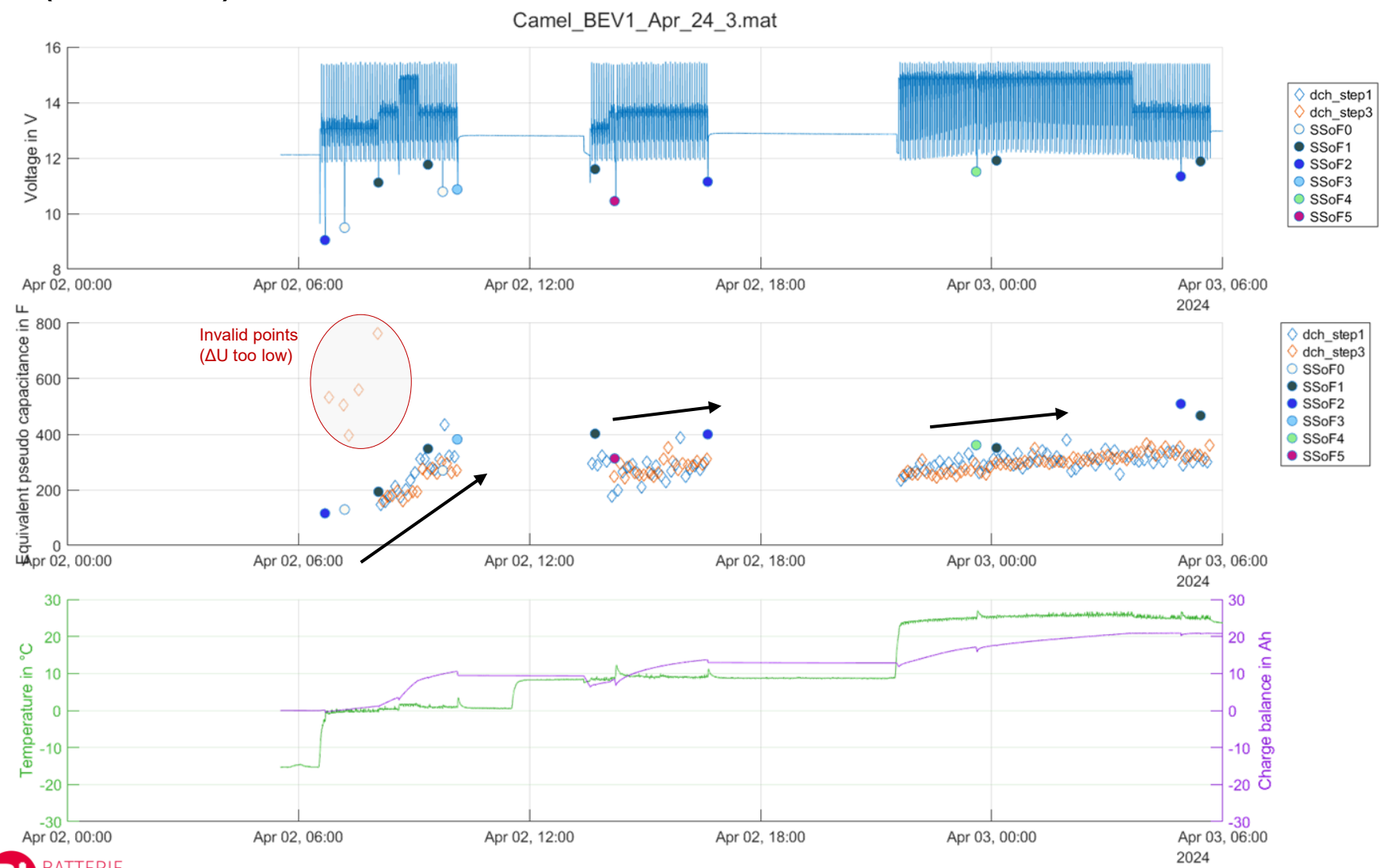
$\vartheta_{\text{bat}} = -12...-7$ °C

Limitations

- I_{cc} rating adjusted to meet performance of first pulse
- Extrapolation from 5 s to 1 s pulse not yet validated
- Parameters for SoC and temperature estimation need careful adjustments

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BEV1 Day 1 (BEVsal) on 40 Ah AGM



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BEV1 Day 3 (BEVkin) on 40 Ah AGM

