

1 **Supplementary material**

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3 **On the accuracy of temperature estimates from *in operando* X-ray diffraction**
4 **measurements during additive manufacturing**

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20 **A** *In situ* X-ray diffraction

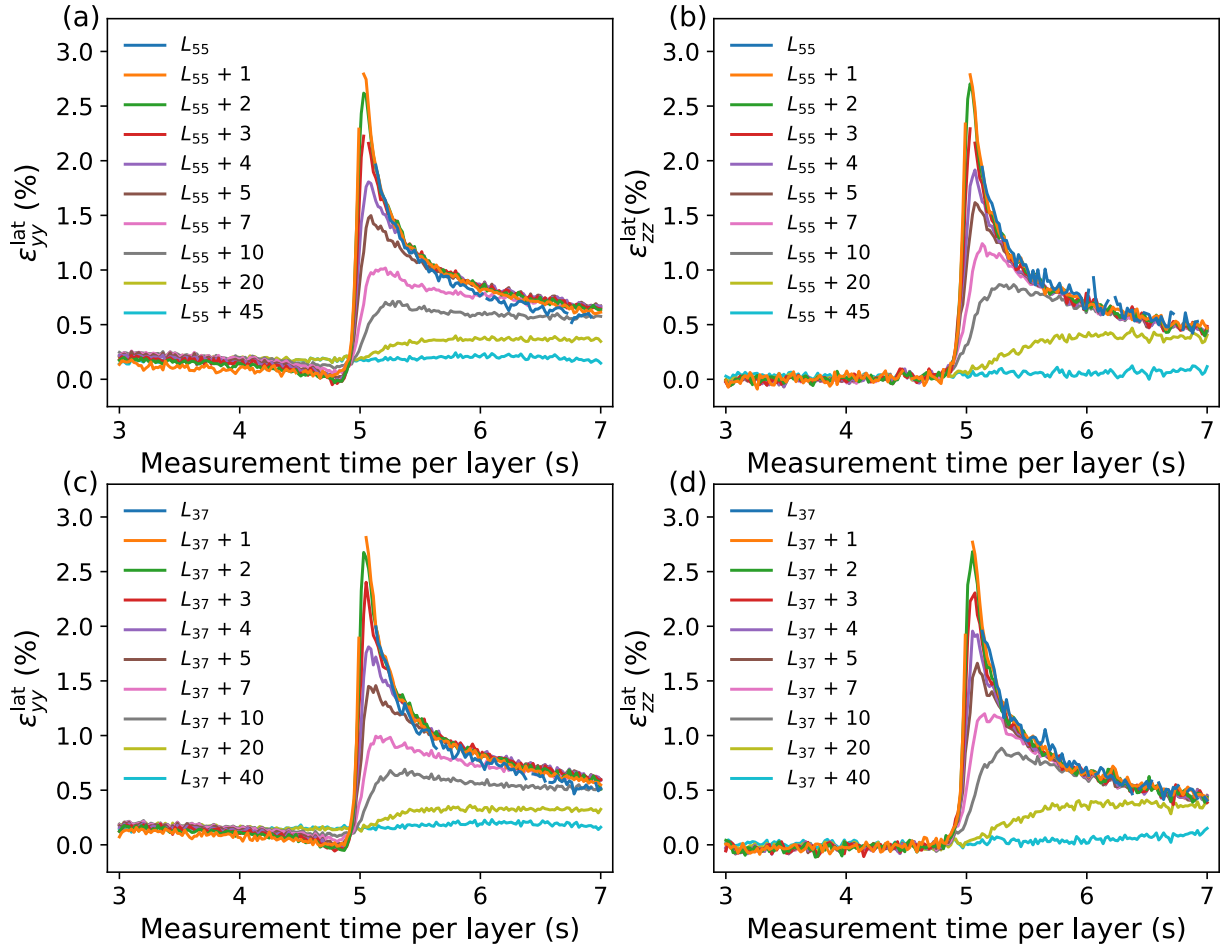


Figure A.1: Evolution of (a and c) $\varepsilon_{yy}^{\text{lat}}$ (along PD) and (b and d) $\varepsilon_{zz}^{\text{lat}}$ (along BD) at $z = 11$ mm (a and b), $z = 7.4$ mm (c and d) above the substrate during the process.

21 **B Numerical simulations**

22 **B.1 Lattice strain evolution**

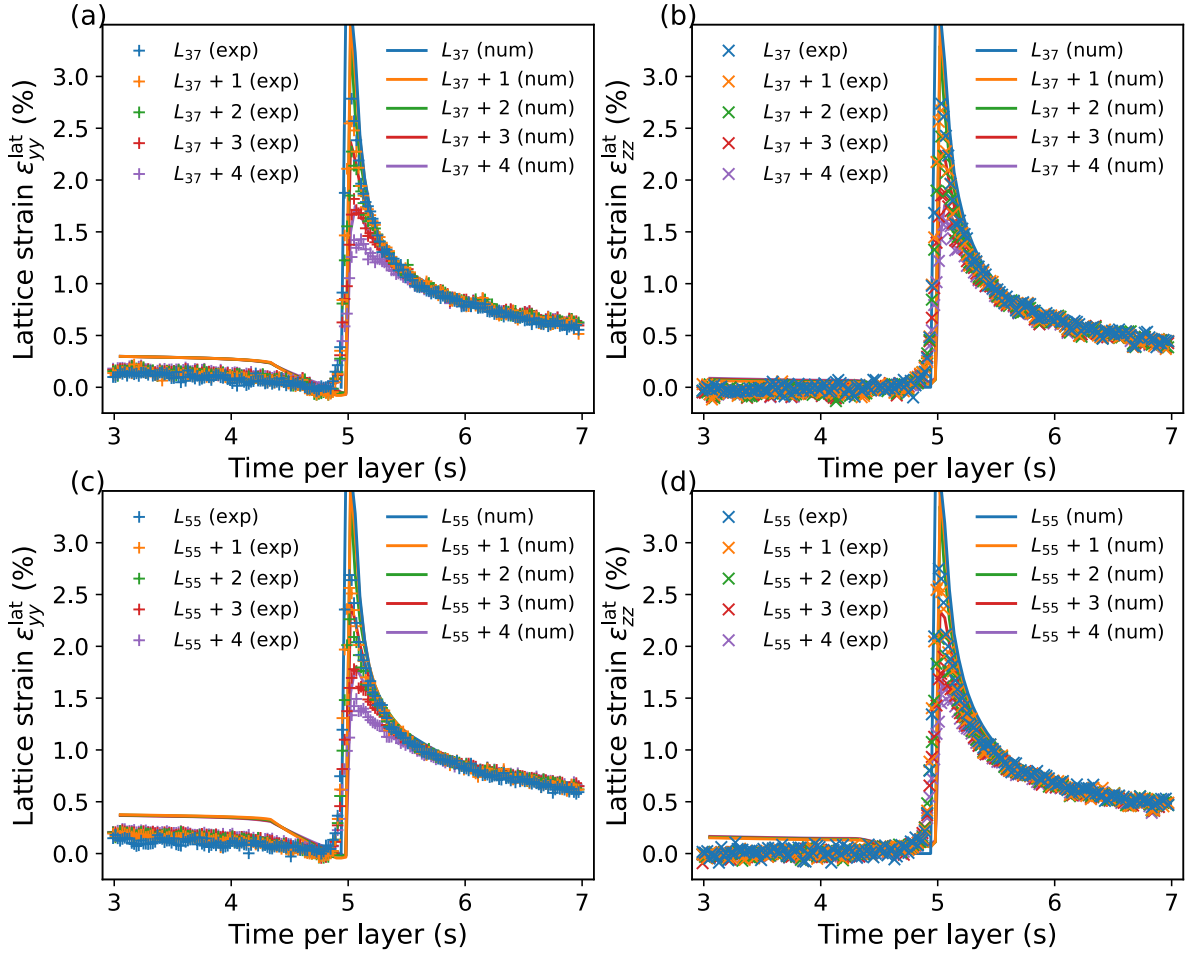


Figure B.2: Evolution of the computed and measured (a) $\varepsilon_{yy}^{\text{lat}}$ along PD at $z = 7.4$ mm, (b) $\varepsilon_{zz}^{\text{lat}}$ along BD at $z = 7.4$ mm, (c) $\varepsilon_{yy}^{\text{lat}}$ along PD at $z = 11$ mm and (d) $\varepsilon_{zz}^{\text{lat}}$ along BD at $z = 11$ mm.

23 **B.2 Elastic strain evolution**

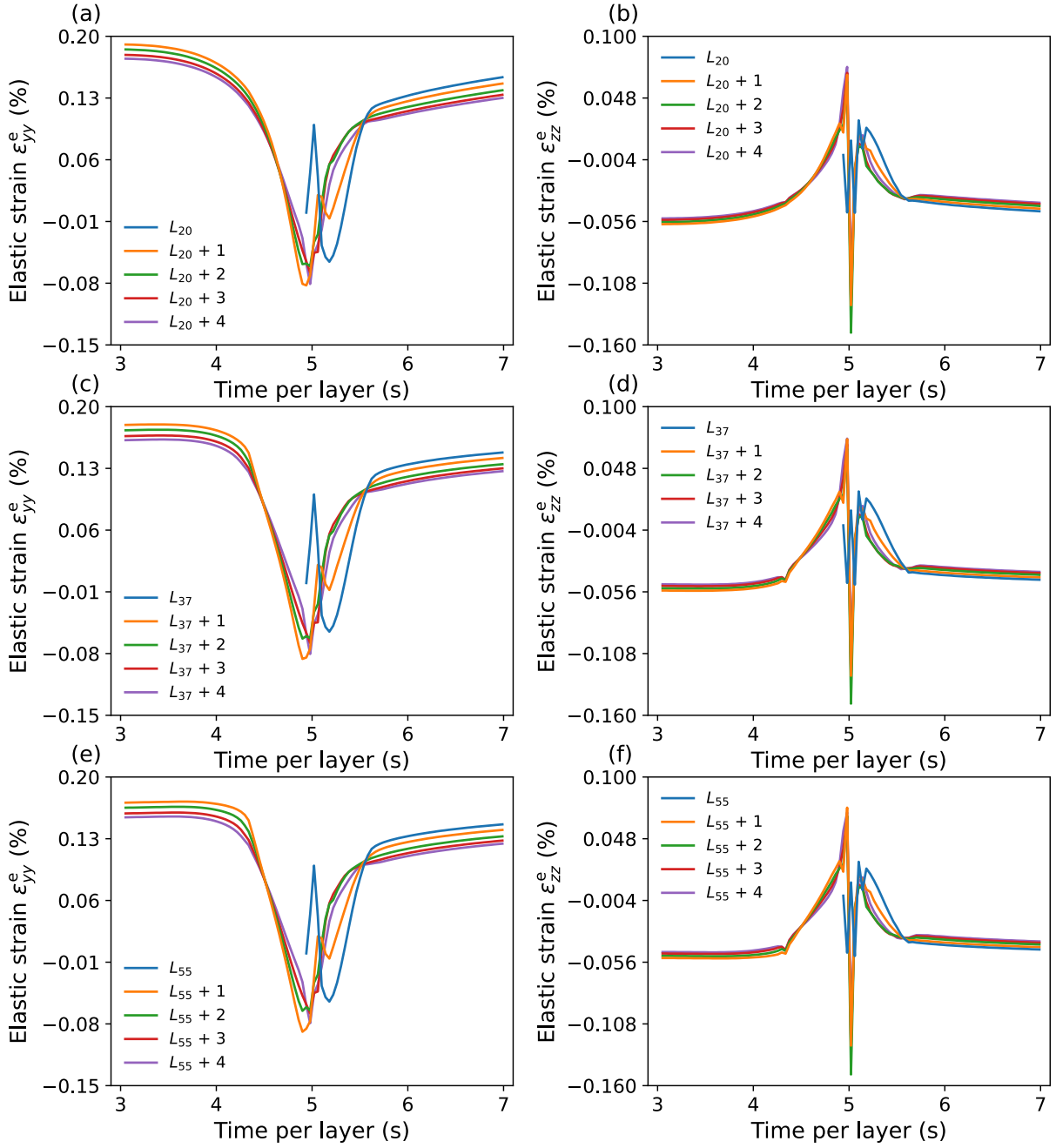


Figure B.3: (a) Elastic strain ε_{yy}^e along the PD at $z=4$ mm, (b) Elastic strain ε_{zz}^e along the BD at $z=4$ mm, (c) Elastic strain ε_{yy}^e along the PD at $z=7.4$ mm, (d) Elastic strain ε_{zz}^e along the BD at $z=7.4$ mm, (e) Elastic strain ε_{yy}^e along the PD at $z=11$ mm, (f) Elastic strain ε_{zz}^e along the BD at $z=11$ mm.