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Magnetic field formation and diffusion via biermann battery effect for laboratory cluster blast waves ALBERTO MAROCCHINO, Dipartimento SBAI, Universit di Roma "La Sapienza," Italy, LORENZO ROMAGNANI, LULI, Ecole Polytechnique, CNRS, CEA, UPMC, Palaiseau, France, ANNA LEVY, Sorbonne Universités, UPMC, Paris 06, CNRS, INSP, UMR 7588, INSP, F-75005, Paris, France, SATOSHI JINNO, YUJI FUKUDA, Kansai Photon Science Institute (KPSI), Japan Atomic Energy Agency (JAEA), Kyoto, Japan, LIVIA LANCIA, Dipartimento SBAI, Università di Roma "La Sapienza," Italy, ALESSANDRA RAVASIO, LULI, Ecole Polytechnique, CNRS, CEA, UPMC, Palaiseau, France, ANGELO SCHIAVI, Dipartimento SBAI, Universit di Roma "La Sapienza," Italy, STEFANO ATZENI, Dipartimento SBAI, Università di Roma "La Sapienza," Italy , DOMENICO DORIA, MARCO BORGHESI, Centre for Plasma Physics, The Queen's University, Belfast, UK — A recent campaign on the ELFIE laser at LULI investigated laboratory Blast Waves (BW) relevant to astrophysical scenarios. A 2ω 2J laser was focused into an Argon cluster gas in order to launch an intense Blast Wave ($\varepsilon \sim 0.5\mathrm{MJ/cm^3}$). Its evolution was investigated from the early Coulomb explosion to late times ($\sim$ 50ns) via proton radiography, revealing an intense electric field with B-field traces at early times, and no fields detected in the later, purely hydrodynamic phase. Simulations performed with the DUED code reproduce well the experiment, confirming magnetic field formation in the early phase, where the Biermann Battery term is for a short time dominant. At late times, magnetic field diffusion becomes dominant with the B-field diffusing away in front of the BW and only a small portion captured within the remnant.

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