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The optical state of the flaring blazar BL Lacertae approaches again the historical brightness of the 2020 outburst

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on 12 Jan 2021; 20:03 UT

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Subjects: Optical, X-ray, Gamma Ray, >GeV, TeV, VHE, Request for Observations, AGN, Blazar, Transient

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We report that the blazar BL Lacertae (RA: 22 02 43.29 Dec: +42 16 39.98 J2000.0) reached in a single 180 s exposure taken on 2021 January 8.72 the optical magnitude $R=12.01(0.01)$. We are intensively monitoring BL Lacertae in the optical band since last summer, from the astronomical observatories listed in the last paragraph, within an optical monitoring program devoted to BL Lacertae coordinated by the Whole Earth Blazar Telescope (WEBT) Collaboration.

The following table reports our last measurements in the Johnson-Cousins VRI filters (averaged over 9 frames for each filter) from the Astronomical Observatory of the University of Siena:

Civil Date(UT)	Mag (dMag)
2021 Jan. 8.74	$V=12.67(0.01)$
2021 Jan. 8.75	$R=12.06(0.01)$
2021 Jan. 8.75	$I=11.31(0.01)$

The reported magnitudes are close to their historical maxima in all the observed photometric bands. These measurements were obtained using the photometric sequence made available by the WEBT Collaboration (<http://www.oato.inaf.it/blazars/webt/gasp/fc/2200fc.html>). Regarding the reported R magnitude, we stress that similar or lower magnitudes have been reached only a few times along the last 15 years according to the long term monitoring made publicly available by the Tuorla Observatory at http://users.utu.fi/kani/1m/BL_Lac.html. In particular, the R-band optical state is only ~0.3 mag dimmer than the historical optical magnitude $R=11.73$ measured on 2020 Oct 05.45 by M. Sasada et al. with the KANATA telescope (ATel#14081) in the wider context of a prolonged, exceptional outburst followed by many collaborations and instruments at all wavelengths from IR to VHE gamma-rays (see ATels #13930,#13933,#13956,#13958,#13963,#13964,#14032,#14065,#14069,#14072,#14081,#14096).

Any enquiry on these observations can be addressed either to Alessandro Marchini (marchini@unisi.it) or to Giacomo Bonnoli (bonnoli@iaa.es). We will continue monitoring the source in the following nights. Multi-wavelength follow-up is encouraged.

We acknowledge excellent scientific cooperation with, and valuable support from, the WEBT Collaboration, the BOOTES Network Collaboration, the Tuorla Observatory and the MAGIC Collaboration. Co-author Giacomo Bonnoli acknowledges financial support to the Spanish "Ministerio de Ciencia e Innovación" (MICINN) through grant PID2019-107847RB-C44 and Unit

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of Excellence Severo Ochoa award to the Instituto de Astrofísica de Andalucía - CSIC (SEV-2017-0709).

A brief description of the instrumental setup used for the reported observation is available at the official webpage of the Astronomical Observatory of the University of Siena (see link below).

Our long-term campaign has been conducted with the following optical facilities: the 0.2 m telescope at ObsCT Private Observatory in Catania (Italy); the 0.25 m telescope at the Gruppo Astrofili Catanesi Observatory in Catania (Italy); the 0.91 m telescope at the « M.G. Fracastoro» observing station (559) in Serra La Nave, Catania (Italy); the 0.2 m telescope at Hypatia Observatory (L62) in Rimini (Italy); the 0.53 m telescope at Montarrenti Observatory (C88) in Siena (Italy); the 0.3 m telescope at Osservatorio Astronomico Città di Seveso (C24) in Seveso (MB, Italy); the 0.3 m telescope at the Astronomical Observatory of the University of Siena (K54) in Siena (Italy); the 0.24 m telescope at Wild Boar Remote Observatory (K49) in San Casciano Val di Pesa (FI, Italy), the 0.6 m telescope at BOOTES-2 Observatory (Z82) in Algarrobo-Costa (Malaga, Spain).

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