```
H. Ahmed¹, P. Allport², R. Amos³, C.J. Baker⁴, J. Bamber⁵, T. Becker⁶, W. Bertscheø, R. Bingham⁰,¹, N. Bliss¹⁰, E. Boella¹¹¹, S. Boogertø, M. Borghesi¹², C. Burne², P.N. Burrows¹³,¹⁴, M. Charlton⁴, J. Clarke¹⁰, B. Cox³, T.S. Dascalu¹¹, M. Dosanjh¹³,¹⁵, N.P. Dover¹⁵,¹⁶, S. Eriksson⁴, O.C. Ettlinger¹⁵,¹⁶, A. Fernandez-Rodriguez¹¹,¹¹ð, A. Giaccia¹⁰,²⁰, S. Gibson²¹,²², R. Gray⁰, S. Green²³, T. Greenshaw²⁴, D. Gujral²⁵, H. Hall²⁶, E.M. Hammond¹⁰, C. Hardiman²⊓, E.J. Harris⁵, P. Hobson²ð, L. Holland²⁰, A. Howard¹⁵,¹⁶, R.P. Hugtenburg³₀, A. Isaac⁴, S. Jamison¹¹, W.G. Jones¹⁵,²⁶, K.J. Kirkby³¹,³², A. Kirkland²⁰,³³, A. Knoll³⁴, N. Kumar²⁴, T.J. Kuo¹⁵,¹⁶, A. Kurup¹⁵,¹⁶, J.B. Lagrange³⁵, H.T. Lau¹⁵,¹⁶, K.R. Long¹⁵,¹⁶, W.G. Luk³⁶, A.E. MacIntosh-LaRocque¹⁵,¹ſ, T. Masilela¹⊓, M. Maxouti¹⁵,¹ſ₀, J.M. McGarrigle¹⁵,¹⊓, A. McIlvenny³¬, P. McKenna⁰,¬, R. McLauchlan²¬,¹,⁵, I. McNeish³ð, M. Merchant³¹, Z. Najmudin¹⁵,¹ſ₀, O. Nicholas⁴, S.R. OʻNeill¹¹¹, L. Obst-Huebl³¬, U. Oelfke⁵, H. Owen¹⁰, C. Palmer¹², J.L. Parsons³⁰, J. Pasternak¹⁵,¹ſ₀, M. Patel²⁴, R. Pattathil¹, M. Pereira²¹, H. Poptani⁴⁰, F. Pouzoulet¹¬, J. Pozimski¹⁵,¹ſ₀, J. Prado Pico⁴¹, Y. Prezado¹¬,¹≀ð, P. Price³ð, T. Price², K.M. Prise⁴³, P. Ratoff¹¹,¬, C.T. Rogers³⁵, F. Romano⁴⁴, P. Ruksasakchai⁴, G. Schettino⁴⁵,⁴ſ₀, W. Shields²¹²,²², B. Smart⁴¬, R.A. Smith¹⁵, A. Snijders³¬, D. Spiers⁰,¬, R. Taylor¹⁵,ſ₀, J. W.G. Thomason³⁵, S. Towe⁴ð, M. Turner⁴¹, P. Underwood⁴ð, A. Vikhoreva¹⁰, P. Weightman²⁴, C.P. Welsch²⁴, C. Wheldon², C. Whyte⁰,¬, R. Wilson⁰, R. Xiao⁴⁰.
```

<sup>&</sup>lt;sup>1</sup>Central Laser Facility, STFC Rutherford Appleton Laboratory, Harwell Oxford, Didcot, OX11 0QX, UK.

<sup>&</sup>lt;sup>2</sup>School of Physics and Astronomy, University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK.

<sup>&</sup>lt;sup>3</sup>Dept of Medical Physics and Biomedical Engineering, University College London, WC1E 6BT, UK.

<sup>&</sup>lt;sup>4</sup>Department of Physics, Faculty of Science and Engineering, Swansea University, Singleton Park, Swansea, SA2 8PP, UK.

<sup>&</sup>lt;sup>5</sup>The Institute of Cancer Research, 123 Old Brompton Road, London, SW7 3RP, UK.

<sup>&</sup>lt;sup>6</sup>Maxeler Technologies Limited, 3 Hammersmith Grove, London, W6 0ND, UK.

<sup>&</sup>lt;sup>7</sup>Cockcroft Institute, Daresbury Laboratory, Sci-Tech Daresbury, Keckwick Lane, Daresbury, Warrington, WA4 4AD, UK.

<sup>&</sup>lt;sup>8</sup>Department of Physics and Astronomy, The University of Manchester, Oxford Road, Manchester, M13 9PL, UK.

<sup>&</sup>lt;sup>9</sup>Department of Physics, SUPA, University of Strathclyde, Glasgow G4 0NG, UK.

<sup>&</sup>lt;sup>10</sup>STFC Daresbury Laboratory, Daresbury, Cheshire, WA4 4AD, UK.

<sup>&</sup>lt;sup>11</sup>Department of Physics, Lancaster University, Bailrigg, Lancaster, LA1 4YW, UK.

<sup>&</sup>lt;sup>12</sup>School of Mathematics and Physics, Queen's University Belfast, University Road, Belfast, BT7 1NN, UK.

<sup>&</sup>lt;sup>13</sup>Particle Physics, Denys Wilkinson Building, Keble Road, Oxford, OX1 3RH, UK.

<sup>&</sup>lt;sup>14</sup>John Adams Institute, University of Oxford, Keble Road, Oxford, OX1 3RH, UK.

<sup>&</sup>lt;sup>15</sup>Department of Physics, Imperial College London, Exhibition Road, London, SW7 2AZ, UK.

<sup>&</sup>lt;sup>16</sup>The John Adams Institute for Accelerator Science, Imperial College London, London, SW7 2AZ, UK.

<sup>&</sup>lt;sup>17</sup>Institut Curie-Orsay Research Center, Bat a Campus d'Orsay, 91400 Orsay, France.

<sup>&</sup>lt;sup>18</sup>Institut Curie, Université PSL, CNRS UMR3347, Inserm U1021, Signalisation Radiobiologie et Cancer, 91400 Orsay, France.

<sup>&</sup>lt;sup>19</sup>Oxford Institute for Radiation Oncology, Department of Oncology, University of Oxford, Old Road Campus Research Building, Roosevelt Drive, Oxford, OX3 7DQ, UK.

<sup>&</sup>lt;sup>20</sup>Department of Radiation Oncology, Stanford University, Stanford, CA 94305, USA.

<sup>&</sup>lt;sup>21</sup>Department of Physics, Royal Holloway University of London, Egham, Surrey, TW20 0EX, UK.

<sup>&</sup>lt;sup>22</sup>John Adams Institute, Department of Physics, Royal Holloway, University of London, Egham, TW20 0EX, UK.

<sup>&</sup>lt;sup>23</sup>Department of Medical Physics, University Hospital Birmingham Foundation NHS Trust, Edgbaston, Birmingham, B15 2TH, UK.

<sup>&</sup>lt;sup>24</sup>Department of Physics, University of Liverpool, Liverpool, L69 7ZE, UK.

<sup>&</sup>lt;sup>25</sup>Imperial College Healthcare NHS Trust, Department of Clinical Oncology, Charing Cross Hospital, London ,W6 8RF, UK.

- <sup>26</sup>Imperial College London, CRUK PPI group, Charing Cross Hospital, London, W6 8RF, UK.
- <sup>27</sup>Department of Radiation Physics and Radiobiology, Imperial College Healthcare NHS Trust, London, W2 1NY, UK.
- <sup>28</sup>School of Physical and Chemical Sciences, Queen Mary University of London, Mile End, London, E1 4NS, UK.
- <sup>29</sup>Rosalind Franklin Institute, Harwell Campus, Didcot, OX11 OQX, UK.
- <sup>30</sup>Department of Physics, Faculty of Science and Engineering, Swansea University, Singleton Park, Swansea, SA2 8PP, UK.
- <sup>31</sup>Division of Cancer Sciences, Faculty of Biology, Medicine and Health, The University of Manchester, The Christie Proton Therapy Centre, The Christie NHS Foundation Trust, Wimslow Road, Manchester, M20 4BX, UK.
- <sup>32</sup>The Christie NHS Foundation Trust, Wilmslow Road, Manchester, M20 4BX, UK.
- <sup>33</sup>Department of Materials, University of Oxford, Parks Road, Oxford, OX1 3PH, UK.
- <sup>34</sup>Department of Aeronautics, Imperial College London, Exhibition Road, London, SW7 2AZ, UK.
- <sup>35</sup>ISIS Neutron and Muon Source, STFC Rutherford Appleton Laboratory, Harwell Oxford, Didcot, OX11 0QX, UK.
- <sup>36</sup>Department of Computing, Imperial College London, Exhibition Road, London, SW7 2AZ, UK.
- <sup>37</sup>Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720, USA.
- <sup>38</sup>Department of Surgery and Cancer, Imperial College, Hammersmith Hospital, London, W12 0NN, UK.
- <sup>39</sup>Department of Cancer and Genomic Sciences, College of Medicine and Health, University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK.
- <sup>40</sup>Institute of Systems, Molecular and Integrative Biology, University of Liverpool, Biosciences Building, Crown Street, Liverpool, L69 7BE, UK.
- <sup>41</sup>DG Unit, CERN, CH-1211 Geneva 23, Switzerland.
- <sup>42</sup>University of Santigao de Compostela, Center for Research in Molecular Medicine and Chronic Diseases, 15782, Santiago de Compostela, Spain.
- <sup>43</sup>Patrick G Johnston Centre for Cancer Research, Queens University Belfast, 97 Lisburn Road, Belfast, BT9 7AE, UK.
- <sup>44</sup>Dipartimento di Fisica e Astronomia "Ettore Majorana", INFN Catania, Via Santa Sofia, 64 95123 Catania, Italy.
- <sup>45</sup>Department of Physics, University of Surrey, 388 Stag Hill, Guildford, GU2 7XH, UK.
- <sup>46</sup>National Physical Laboratory, Hampton Road, Teddington, TW11 0LW, UK.
- <sup>47</sup>Particle Physics Department, STFC Rutherford Appleton Laboratory, Harwell, Oxford, Didcot, OX11 0QX, UK.
- <sup>48</sup>Leo Cancer Care, Broadview, Windmill Hill, Hailsham, East Sussex, BN27 4RY, UK.
- <sup>49</sup>Corerain Technologies, 14F, Changfu Jinmao Building (CFC), Trade-free Zone, Futian District, Shenzhen, Guangdong, China.