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Plasma sources for laser- and beam-driven plasma accelerators

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All plasma accelerators require a region of plasma in which the plasma waves are driven, yet this key component is often taken for granted. The plasma source will usually need to be well-defined in terms of its spatial extent, density, uniformity, and composition. Further, plasma does not exist at room temperature, and hence the ionization mechanism must be considered; the plasma may need to perform other functions, such as optical guiding; and the design of the plasma source may be constrained by its environment, for example by materials compatibility or vacuum requirements.

I will review the plasma sources used to date in plasma accelerators driven by particle beams and laser pulses, and will try to identify the main challenges for the next generation of plasma accelerators.

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