

## Detection of submillimeter-wave [C I] emission in gaseous debris disks; 49 Ceti and $\beta$ Pictoris

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We have detected the [C I]  $^3P_1-^3P_0$  emission in the gaseous debris disks, 49 Ceti and  $\beta$  Pictoris, with the Atacama Submillimeter Telescope Experiment (ASTE). The line profiles of [C I] is found to be those of CO(J=3-2) observed with the same telescope as well as the Atacama Large Millimeter/submillimeter Array (ALMA). This result suggests that the atomic carbon (C) coexists with CO in the debris disks, and is likely formed by photodissociation of CO. The C/CO column density ratio is thus derived to be  $54 \pm 19$  to  $69 \pm 42$  for 49 Ceti and  $\beta$  Pictoris, respectively. These ratios are higher than those of protoplanetary disks, molecular clouds, and diffuse clouds by an order of magnitude. From the result, we suggest that the origin of a large amount of [C I] in the debris disk would likely be a small amount of the H<sub>2</sub> molecule in the gas disk. This implies a significant contribution of the secondary gas coming out from dust grains.

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