Saturn rings found clumpier, heavier than thought

by Bend_Weekly_News_Sources

SatÂ-urnâ€™s largÂ-est, most compact ring conÂ-sists of tightly packed clumps of parÂ-tÂ-iÂ-cles sepÂ-aÂ-ratÂ-ed by nearly empÂ-ty gaps, acÂ-cordÂ-ing to new findÂ-ings from NASAâ€™s CasÂ-siÂ-ni spaceÂ-craft.

These clumps in SatÂ-urnâ€™s B ring are neatly orÂ-ganÂ-ized and conÂ-stantly colÂ-lidÂ-ing, which surÂ-prised sciÂ-enÂ-tists, they said.â€œWe origÂ-iÂ-nally thought we would see a unÂ-iform cloud of parÂ-tÂ-iÂ-cles,â€• said LarÂ-ry EsÂ-posÂ-ito, prinÂ-ciÂ-pal inÂ-vesÂ-tiÂ-gaÂ-tor for the CasÂ-siÂ-ni ulÂ-traÂ-viÂ-oÂ-let imÂ-agÂ-ing specÂ-troÂ-graph at the UnÂ-iversÂ-ity of ColÂ-oÂ-radÂ-o, BoulÂ-der.

This false-color imÂ-age of SatÂ-urn's rings was made usÂ-ing a CasÂ-siÂ-ni inÂ-struÂ-ment called the ultraÂ-violet imÂ-agÂ-ing specÂ-troÂ-graph. SciÂ-enÂ-tists used it to recÂ-ord ocÂ-culÂ-taÂ-tions, in which a star's brightÂ-ness changes as the rings pass in front of it, reÂ-vealÂ-ing the amount of ring maÂ-teÂ-riÂ-al beÂ-tween the craft and the star. CasÂ-siÂ-ni gave sciÂ-enÂ-tists the most deÂ-tailed view yet of the B ring and found that this part of the rings is denseÂ-ly packed with conÂ-stantÂ-ly colÂ-lidÂ-ing clumps called self-gravity wakes, sepÂ-aÂ-ratÂ-ed by gaps. The clumps, 30 to 50 meÂ-ters (100 to 160 feet) across, are too small to be seen diÂ-rectÂ-ly, but reÂ-searchÂ-ers can map their disÂ-triÂ-buÂ-tion, shape and oriÂ-enÂ-taÂ-tion. ColÂ-ors here inÂ-diÂ-cate their oriÂ-enÂ-taÂ-tion; brightÂ-ness inÂ-diÂ-cates denÂ-siÂ-ty of ring parÂ-tÂ-iÂ-cles. Those in the yelÂ-low zone are too denseÂ-ly packed for starÂ-light to pass through. (CreÂ-dit: NAÂ-SA/JPL/UniÂ-verÂ-sÂ-ity of CoÂ-loÂ-raÂ-do)

â€œInÂ-stead we find that the parÂ-tÂ-iÂ-cles are clumped toÂ-gethÂ-er with empÂ-ty spaces in beÂ-tween. If you were flyÂ-ing unÂ-der SatÂ-urnâ€™s rings in an airÂ-plane, you would see these flashes of sunÂ-light come through the gaps, folÂ-lowed by dark and so forth. This is difÂ-ferÂ-ent from flyÂ-ing unÂ-der a unÂ-iform cloud of parÂ-tÂ-iÂ-cles.â€• BeÂ-cause preÂ-viÂ-ous inÂ-terÂ-pretaÂ-tÂ-ions asÂ-sumed the ring parÂ-tÂ-iÂ-cles were disÂ-tribÂ-utÂ-ed unÂ-iformly, sciÂ-enÂ-tists unÂ-derÂ-esÂ-tiÂ-mated the toÂ-tal mass of SatÂ-urnâ€™s rings, reÂ-searchÂ-ers said: the mass may acÂ-tuÂ-ally be two or more times preÂ-viÂ-ous esÂ-tiÂ-mates. â€œThese reÂ-sults will help us unÂ-derÂ-stand the overÂ-all quesÂ-tion of the age and hence the orÂ-iÂ-gin of SatÂ-urnâ€™s rings,â€• said Josh ColÂ-well of the UnÂ-iversÂ-ity of CenÂ-tral FlorÂ-iÂ-da, OrÂ-lanÂ-do, and a team memÂ-ber of the CasÂ-siÂ-ni ulÂ-traÂ-viÂ-oÂ-let imÂ-agÂ-ing specÂ-troÂ-graph. A paÂ-per deÂ-tailÂ-ing the reÂ-sults apÂ-pears in the April 13 early onÂ-line isÂ-sue of the reÂ-search jourÂ-nal IcÂ-aÂ-rus.

Courtesy NASA and World Science staff