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The General Assembly of Galaxy Halos: Structure, Origin and Evolution

LEO P: HOW MANY METALS CAN A VERY LOW-MASS, ISOLATED GALAXY RETAIN?*

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ABSTRACT

Leo P is a gas-rich dwarf galaxy with an extremely low gas-phase oxygen abundance (3% solar). The isolated nature of Leo P enables a quantitative measurement of metals lost solely due to star formation feedback. We present an inventory of the oxygen atoms in Leo P based on the gas-phase oxygen abundance measurement, the star formation history, and the chemical enrichment evolution derived from resolved stellar populations. The star formation history also provides the total amount of oxygen produced. Overall, Leo P has retained 5% of its oxygen; 25% of the retained oxygen is in the stars while 75% is in the gas phase. This is considerably lower than the $20-25\%$ calculated for massive galaxies, supporting the trend for less efficient metal retention for lower mass galaxies. The retention fraction is higher than that calculated for other alpha elements (Mg, Si, Ca) in dSph Milky Way satellites of similar stellar mass and metallicity. Accounting only for the oxygen retained in stars, our results are consistent with those derived for the alpha elements in dSph galaxies. Thus, under the assumption that the dSph galaxies lost the bulk of their gas mass through an environmental process such as tidal stripping, the estimates of retained metal fractions represent underestimates by roughly a factor of four. Because of its isolation, Leo P provides an important datum for the fraction of metals lost as a function of galaxy mass due to star formation.

Subject headings: galaxies: dwarf – galaxies: stellar content – galaxies: evolution – galaxies: abundances

Keywords. accretion, galaxy formation, starbursts, dwarf irregulars

Leo P — изолированная галактика, без каких-либо признаков взаимодействия или выпадения необогащенного газа. Ложится на продолжение зависимости M-Z, вероятно эволюция определяется в основном внутренними процессами, а не внешними событиями.

Но с текущим ЗО, есть одна HII область -> можно изучать влияние feedback от ЗО.

Table 1
Properties of Leo P

R.A. (J2000)	10:21:45.1
Decl. (J2000)	+18:05:17
Distance (Mpc)	1.62±0.15
M_V (mag)	-9.27 ± 0.20
M_* ($M_\odot$)	5.6×10^5
M_{HI} ($M_\odot$)	8.1×10^5
12+log(O/H)	7.17±0.04

Table 2
Oxygen Budget in Leo P

Total O Produced	$5.7 \pm 0.1 \times 10^3$ $M_\odot$
O locked in stars (O_*)	68 ± 16 $M_\odot$
O in the ISM (O_{gas})	192±18 $M_\odot$
"Missing" O (ΔO)	$5.4 \pm 0.1 \times 10^3$ $M_\odot$
Percent of O Lost	95±2%

Проведена фотометрия на Хаббле, построены диаграммы «цвет-зв.величина» → отсюда оценена SFH и количество произведенного кислорода
Отдельно оценено количество кислорода в газе и в звездах.

Осталось лишь 5% кислорода. ¼ в звездах и ¾ в газе.

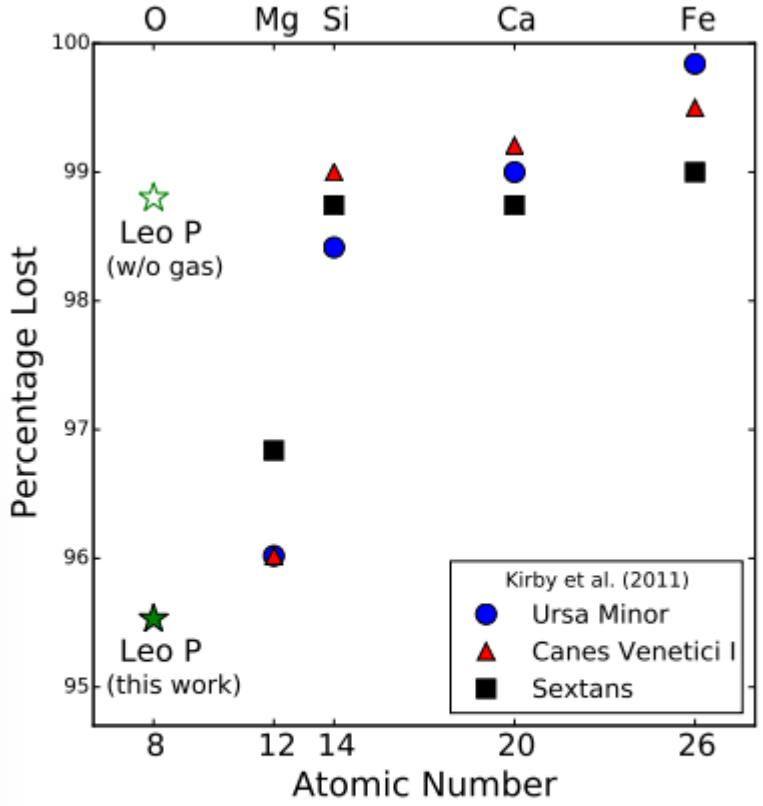
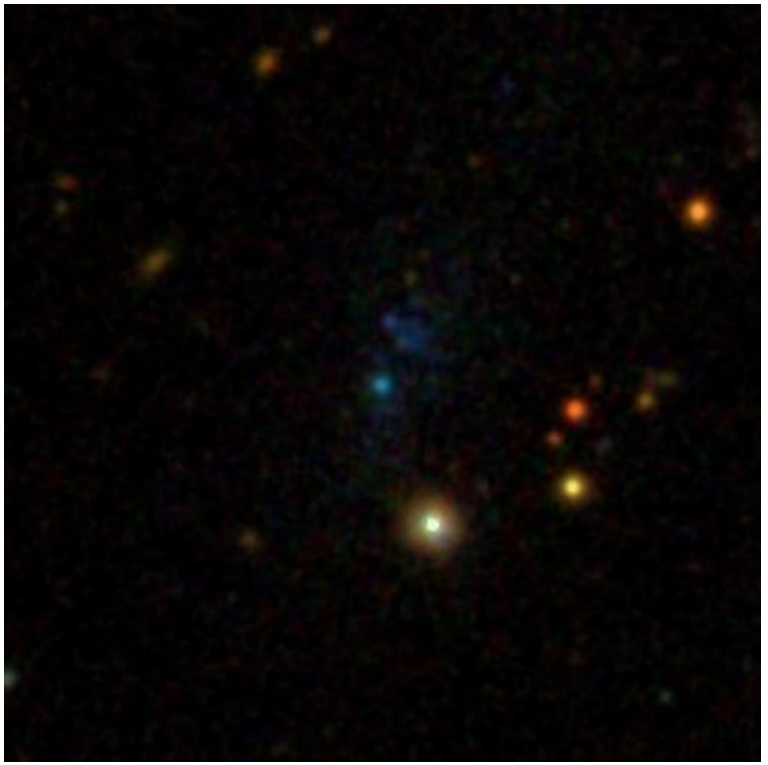


Figure 2. The percentage of O lost in Leo P compared to the percentage of metals lost in 3 Milky Way dSphs of comparable stellar mass from Kirby et al. (2011). Leo P has retained its gas content and thus a larger fraction of O. If the O atoms in the gas phase are ignored, the percentage of O lost is comparable to gas-poor dSphs (unfilled star point). Also note the discrepant low value for Mg loss in the dSphs.



Осталось больше металлов, чем в аналогичных по массе dSphs. Если считать только металлы, заключенные в звездах — столько же. Вероятно, причина в изолированности

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The coffee-machine bacteriome: biodiversity and colonisation of the wasted coffee tray leach

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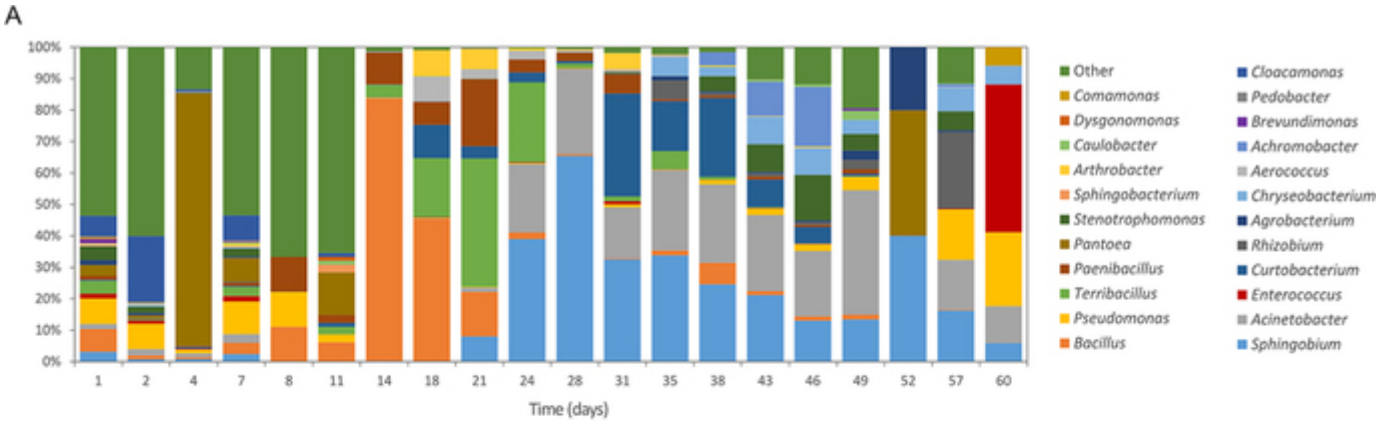
Microbial communities are ubiquitous in both natural and artificial environments. However, microbial diversity is usually reduced under strong selection pressures, such as those present in habitats rich in recalcitrant or toxic compounds displaying antimicrobial properties. Caffeine is a natural alkaloid present in coffee, tea and soft drinks with well-known antibacterial properties. Here we present the first systematic analysis of coffee machine-associated bacteria. We sampled the coffee waste reservoir of ten different Nespresso machines and conducted a dynamic monitoring of the colonization process in a new machine. Our results reveal the existence of a varied bacterial community in all the machines sampled, and a rapid colonisation process of the coffee leach. The community developed from a pioneering pool of enterobacteria and other opportunistic taxa to a mature but still highly variable microbiome rich in coffee-adapted bacteria. The bacterial communities described here, for the first time, are potential drivers of biotechnologically relevant processes including decaffeination and bioremediation.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52
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Time (days)
Other
Comamonas
Dysgonomonas
Caulobacter
Arthrobacter
Sphingobacterium
Stenotrophomonas
Pantoea
Paenibacillus
Terribacillus
Pseudomonas
Bacillus
Cloacamonas
Pedobacter
Brevundimonas
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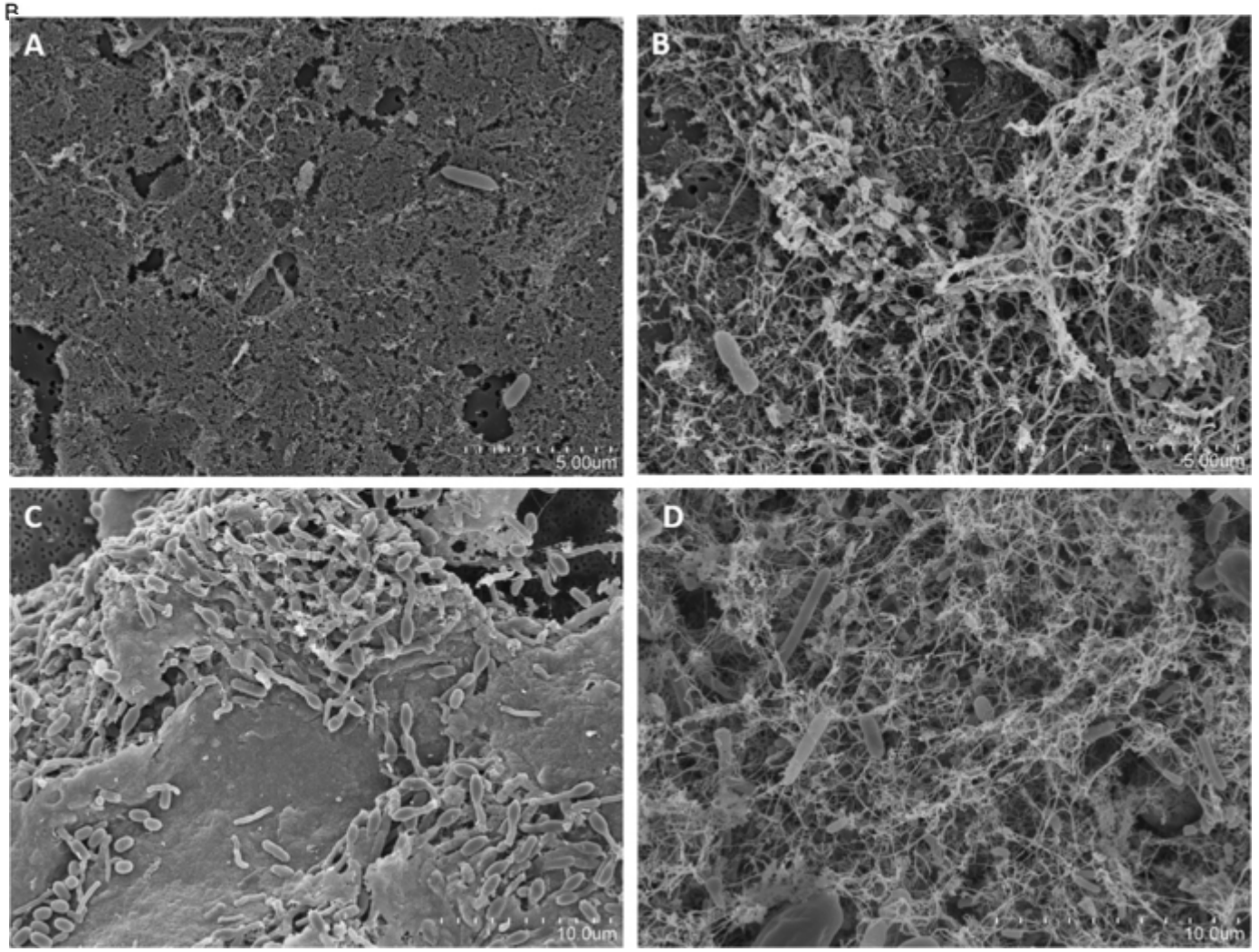
Aerococcus
Chryseobacterium
Agrobacterium
Rhizobium
Curtobacterium
Enterococcus
Acinetobacter
Sphingobium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